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January 15, 2010

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Glen Dickinson, Director
Legislative Services Agency
State Capitol Building
Des Moines IA 50319

Re: Grow Iowa Values Funding (GIVF)

Dear Members of the Iowa General Assembly:

Pursuant to Iowa Code §15G.111(2), the enclosed annual report includes information from the University of Iowa, Iowa State University, the University of Northern Iowa, and Private Universities and Colleges for FY 2007, FY 2008, FY 2009, and FY 2010 (year-to-date) on revenues and expenditures related to GIVF appropriations.

If there are any questions concerning this report, please do not hesitate to contact us.

Sincerely,

Robert Donley

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Enclosure

cc: Legislative Liaisons
Legislative Log

Iowa State University - as of December 31, 2009
 Grow Iowa Values Fund Appropriations

1	Commercialization Infrastructure and Campus-Wide Entrepreneurial C.	FY 2007 GIVF Appropriation	\$600,000	\$1,925,000	Board of Regents approved August 2007
2	Commercialization Program		\$1,325,000		
1	Commercialization Infrastructure and Campus-Wide Entrepreneurial C.	FY 2008 GIVF Appropriation	\$600,000	\$1,925,000	Board of Regents approved August 2008
2	Commercialization Program		\$1,325,000		

Iowa State University	Project	List of all FY 2007 Revenue Sources	Revenue Dollars for FY 2007	Amount of FY 2007 State Appropriations Expended as of 12/31/2009	List of all FY 2008 Revenue Sources	Revenue Dollars for FY 2008	Amount of FY 2008 State Appropriations Expended as of 12/31/2009
1	Commercialization Infrastructure and Campus-Wide Entrepreneurial C.	FY 2007 State Appropriations (GIVF)	\$600,000	\$600,000	FY 2008 State Appropriations (GIVF)	\$600,000	\$441,092
		FY 2007 Matching Funds (General Fund)	\$464,492		FY 2008 Matching Funds (General Fund)	\$330,276	
		FY 2007 Matching Funds (In-Kind)	\$200,000		FY 2008 Matching Funds (In-Kind)	\$45,000	
		FY 2007 Matching Funds (3rd Party Cash)	\$200,000		FY 2008 Matching Funds (3rd Party Cash)	\$200,000	
		FY 2007 Matching Funds (Other)			FY 2008 Matching Funds (Other)		
Description of Project							
Anticipated End Results							
Results achieved to Date							
Plans							
2	Commercialization Program	FY 2007 State Appropriations (GIVF)	\$1,325,000	\$1,325,000	FY 2008 State Appropriations (GIVF)	\$1,325,000	\$650,803
		FY 2007 Matching Funds (General Fund)	\$888,224		FY 2008 Matching Funds (General Fund)	\$710,278	
		FY 2007 Matching Funds (Federal Support)			FY 2008 Matching Funds (Federal)	\$98,364	
		FY 2007 Matching Funds (In-Kind)	\$548,331		FY 2008 Matching Funds (In-Kind)	\$433,489	
		FY 2007 Matching Funds (3rd Party Cash)	\$43,530		FY 2008 Matching Funds (3rd Party Cash)	\$164,562	
		FY 2007 Matching Funds (Other)			FY 2008 Matching Funds (Other)		
Description of Project							
See individual projects							
Anticipated End Results							
Results achieved to Date							
Plans							
Iowa State University	Project		Allocated Dollars FY 2007				
Description of Project							
Surya Mallapragada, Principal Investigator Protein Micropatterning on Microsensors to Quantify Cell Cytotoxicity of Adherent and Non-adherent Cells							
Anticipated End Results							
Results achieved to Date							
We have optimized our silanization techniques to attach proteins to the indium-tin oxide (ITO) electrode substrates. Using this technique, we have shown that CD34 antibodies can be attached to the ITO electrode substrates covalently, and verified this by atomic force microscopy. In addition, we have cultured CD34+ cells on these substrates and shown good attachment. Our collaborators at Cellular Engineering technologies investigated selective cell adhesion on these substrates.							
Plans							
Iowa State University	Project		Allocated Dollars FY 2007				
Description of Project							
Byron Brehm-Stecher, Principal Investigator Applied Nanotechnology for Label-free Detection of Pathogen-Specific							
Anticipated End Results							
Results achieved to Date							
The original intent of this work was to create AFM-deposited, self-assembling peptide nucleic acid (PNA) ultramicroarrays capable of capturing pathogen-specific nucleic acids, with subsequent detection via either non-specific fluorescent staining and simple imaging or via AFM-detectable differences in spot heights between negative controls and treatments after hybridization. Although we were able to bind PNA probes to chip surfaces, their capture efficiencies for target nucleic acids were low. Subsequently, litigation between the Copenhagen Inventor's Group (original inventors of PNA) and our commercial PNA source (Applied Biosystems) resulted in a lapse in the availability of PNAs. We therefore changed our tact to include a focus on DNA-based probes arrayed onto chip surfaces. Using BioForce Nanosciences' NanoEnabler ultramicroarrayer, we were able to array Salmonella-specific DNA probes to the surface of silica chips and were able to demonstrate specific capture of a short, complementary synthetic DNA target. Once proof of principle was shown in this model system, we were able to demonstrate capture and fluorescence-based detection of purified with large molecules of intact rRNA showed poor binding characteristics. Despite the initial setback of limited PNA availability, we have accomplished all goals of this grant, with the exception of height-based detection of rRNA via AFM. We will continue to work with BioForce Nanosciences to accomplish this goal, using colloidal gold to amplify height differences for array spots occupied by captured Salmonella rRNA. We anticipate submission of this work for publication in 2008.							
Plans							

Iowa State University	Project		Allocated Dollars FY 2007	
	Martha James, Principal Investigator		\$21,800	
Description of Project	Development of Novel Digestion-Resistant Starches from Corn to Combat Human Disease			
Anticipated End Results				
Results achieved to Date	Progress in this final period included additional characterization of the functional properties of two types of cornstarch predicted to be more slowly digestible (i.e., degraded to glucose) in the human system. The prototype starch was made by genetically engineering plants for increased expression of a starch debranching enzyme, which resulted in production of a long-chain amylopectin starch (LCAPS1). A derivative starch termed LCAPS3 was made by crossing LCAPS1 plants with dull1 mutant plants. This combined genetic engineering/breeding approach was predicted to produce a more digestion-resistant type of starch. Starch hydrolysis analyses were performed using a combination of two digestive enzymes, α -amylase and amyloglucosidase. These in vitro tests confirmed LCAPS1 was digested more slowly than normal starch over a two-hour digestion period. LCAPS1 digestion ranged from 40% of normal starch after just 10 minutes incubation to 80% of normal starch after an hour or more. LCAPS3 digestion, however, was slower, approximately 40% to 50% that of normal starch throughout the two-hours.			
Plans				
Iowa State University	Project		Allocated Dollars FY 2007	
	David Grewell, Principal Investigator		\$37,025	
Description of Project	Retooling Ethanol Industries: Integrating Ultrasonics into Dry Corn Milling			
Anticipated End Results				
Results achieved to Date	This work evaluated the use of high power ultrasonic energy to treat corn slurry in dry corn milling ethanol plants to enhance liquefaction and saccharification for ethanol production. Corn slurry samples obtained before and after jet cooking were subjected to ultrasonic pretreatment for 20 and 40 seconds at amplitudes of vibration ranging from 64 to 107 $\mu\text{m}/\text{peak}$ to peak amplitude in μm . The resulting samples were then exposed to enzymes (alpha-amylase and glucoamylase) to convert cornstarch into glucose. A comparison of scanning electron micrographs of raw and sonicated samples showed the development of micropores and the disruption of cell walls in corn mash. The corn particle size declined nearly 20-fold following ultrasonic treatment at high power settings. The glucose release rate from sonicated samples increased as much as 3-fold compared to the control group. The efficiency of ultrasound exceeded 100% in terms of energy gain from the sugar released over the ultrasonic energy supplied. Enzymatic activity was enhanced when the corn slurry was sonicated with simultaneous addition of enzymes. This finding suggests that the ultrasonic energy did not degrade or denature enzymes. Continuous flow studies suggested that single ultrasonic systems (5 kW) could treat 5-10 gallons of corn slurry per second. Based on conservative assumptions, ultrasonication could be implemented on ethanol plants resulting in a pay-back period of less than a year. This work has resulted in over \$300,000 of external funding and equipment donation as well as further studies investigating ultrasonication in various bio-fuels, such as bio-diesel and itaconic acid chemistries. This analysis showed that both modified starches have higher gelatinization temperatures compared to wild type, and the onset, peak, and end gelatinization temperatures for LCAPS3 are significantly higher. Thus, more heat energy is required to dissolve the structure of LCAPS3 starch. A previous human feeding trial designed to test the digestibility of an LCAPS1 containing food product was unsuccessful. That trial fed participants a starch based pudding, and no difference was seen in the glycemic index of the LCAPS1 pudding versus the wild type pudding. In this research period preparation was in progress for a second round of human feeding trials, which will use an alternative to cooked food product. Foods such as muffins, breads, and polenta that include varying amounts of cornstarch (LCAPS1, LCAPS3, or the control) are being produced and evaluated in the laboratory. Based on these results, a food product will be selected for planned feeding trials in the fall of 2008. Finally, Starch Design, LLC is a small biotechnology company that was organized in 2007 to commercialize these and other new starches. The company is in the process of reorganizing as a class C corporation, and has nearly finalized negotiations with ISURF to license intellectual property. Starch Design has begun informal negotiations with two multi-national agricultural biotechnology companies and one multi-national starch company regarding this technology.			
Plans				
Iowa State University	Project		Allocated Dollars FY 2007	
	Mary Holz-Clause, Principal Investigator		\$40,386	
Description of Project	Corn-Biomass Composite Fuel Pellets: An Industry University Partnership			
Anticipated End Results				
Results achieved to Date	The project has been completed. Testing with wood and cob material showed that these formulations produced an inferior product. This resulted in fine-tuning the extruder-die configuration and extrusion parameters for a 100% ethanol-manufacturing co-product pellet that is "commercially firm," i.e., for packaging, shipping, storage and auger-handling. Emissions and combustion testing by Twin-Ports Testing Inc., Superior, WI, demonstrated significantly higher BTU production, lower emissions, and lower ash (residual) production; than corn kernels, wood pellets or composite DDG-wood-dust pellets (compensate and potentially competing fuels). A USDA Rural Development Pass-Through-Loan-Guarantee application was submitted by IADG to assist the ongoing expansion of the fuel-stove production facility in Pella, IA. A patent application regarding the architecture of the extrusion Marketing the technology as a system for sale to ethanol plants was initially proposed by the ISU Extension Value-added Agriculture Project, Ag Pellet Energy is now focusing on their "100% DDG Pellet" to serve both the fuel and feed markets, with the fuel market changing from home and light-industrial application to large-scale power co-generation systems. In March, 2007, a test-burn was conducted at the Wisdom Station power plant, Spencer, Iowa, owned and operated by Corn Belt Power Cooperative, Humboldt, Iowa. The test burn consisted of mixing 10% of Ag Pellet Energy's			
Plans				
Iowa State University	Project		Allocated Dollars FY 2007	
	Hans Van Leeuwen, Principal Investigator	Samir Khanal (original PI) left ISU.	\$81,977	
Description of Project				
Anticipated End Results	Collaborative Research on high Performance Stable Amorphous Silicon-germanium Solar Cells			
Results achieved to Date	Soybean whey is an industrial by-product formed during the extraction of soy protein isolates (SPI) from defatted soy flakes. Nisin is the bacteriocin approved by Food and Drug Administration (FDA) and it is seeing increasing usage as a natural food preservative. The objective of this study is to evaluate the potential of this low/negative value byproduct stream, soybean whey, as an alternative, inexpensive substrate to grow lactic acid bacteria (LAB) (specifically Lactococcus lactis subsp. lactis and produce nisin. This project aims to add value to a waste stream with high organic strength by producing an important product. It will result in local production of a popular but expensive food preservative. Our preliminary studies proved soybean whey an excellent growth medium for LAB fermentation and nisin production. We achieved a biomass yield of 2.18 g/L and nisin yield of 619 mg/L without pH control. The goal of the proposed research is to scale-up nisin production from soybean processing wastewater computer-controlled fermentors for development of commercialization protocols. Furthermore, fungal bioremediation of any residual suspended carbon load after nisin recovery will also be examined to reduce the COD levels before discharge to the environment. The research team has developed excellent partnerships with the Kerry Group, a leader in the global food industry who will be providing the soybean whey, Kemira Industries, with an interest in the nisin product, and West Central, with an interest in the high-quality protein. We envision that this collaboration will lead to industry funding.			
Plans				

Iowa State University	Project			Allocated Dollars FY 2007	
	Vikram Dalal, Principal Investigator			\$63,406	
Description of Project	High Performance Solar Cells				
Anticipated End Results					
Results achieved to Date	<p>Task 1: Improve collection of carriers in a-Si cells on plastic so as to improve cell efficiency, in collaboration with Powerfilm Inc. and transfer technology to production at Powerfilm. This task was successfully completed. Using a multi-layer back reflector of Al followed by doped Zinc oxide, we were able to increase absorption of light into the solar cell, and hence current, by 11% compared to the standard Powerfilm process. This process has been transferred to Powerfilm. They have built a new sputtering system for depositing Al followed by doped zinc oxide. Beyond this process, we have also shown that etching zinc oxide using a wet chemical etch also leads to significant increases in current, about 20% compared to standard process. However, this process is not amenable to mass production, and in future projects, we will utilize a different etching scheme, based on plasma etching (which can be implemented into production), to achieve a similar result. Task 2: Demonstrate that lower bandgap a-Si can be produced using variations in plasma processing, and then fabricate proof of concept solar cells. This task was also completed. We succeeded in reducing the bandgap of a-Si, and hence, increasing absorption of red light, by utilizing a novel low pressure plasma process using a Helium diluted plasma. The bandgap reduced to about 1.67 eV compared to normal 1.75 eV. This is a significant reduction which would help in future production of more efficient tandem junction solar cells. We also succeeded in making proof of concept a-Si solar cells in this new material. Thus, this task was also</p>				
Plans					
Iowa State University	Project		Allocated FY08	Allocated Dollars FY 2007	
	Munjit Misra, Principal Investigator		\$25,000	\$44,695	
Description of Project	Commercialization of a Continuous In-Line Flow Meter				
Anticipated End Results					
Results achieved to Date	<p>We are working with Remington seed plant in Williams, Iowa for field testing of the ISU flowmeter. Drs. Misra and Shyy visited the plant and discussed the testing details with the manager. Presently, seed corn is conditioned and operated 10 hours/day at the facility. They have modified and added a 2-way valve from the discharge end of an elevator from the "Large Flat" sizer bin so the seed corn can be diverted to either flowmeter or a seed-ladder. Another 2-way valve was also added at the end of the flowmeter so that the sample can be collected for flow rate determination. On the bottom of the pipe, a receiving boot was installed so the samples can be dumped back to the flow for recirculation. The flow rate at the point is between 150 to 200 Bushels per hour. We have installed an all-steel, high capacity flowmeter with a data logger to collect the data on site.</p> <p>The preliminary data shows that both mechanical and electrical noise is interfering with the signal from the flowmeter during data acquisition for measurement of flow rate. This is due to the fact that the flowmeter is located on the fourth floor of the tower which houses a dust system with two large fans and cyclones running continuously and four sizers and one air-screen cleaner is running simultaneously on third and second floor. The load cell used in the flowmeter is sensitive enough to pick up vibration from building as well as equipments. To solve this problem, a soft layer will be installed on the load cell surface. To solve the electrical noise from the adjacent motors will need some additional research. A noise reducing circuit will be investigated. We will also separate the flowmeter power line from the high voltage AC source.</p>				
Plans					
Iowa State University	Project			Allocated Dollars FY 2007	
	Larry Johnson, Principal Investigator			\$167,717	
Description of Project	Commercializing New Fractionated Soy Proteins to Improve Human health and Food Quality				
Anticipated End Results					
Results achieved to Date	Five of our six objectives have been completed. We have completed all of the original planned functionality and compositional testing as well as gelling that was added because our market analysis indicated that gelling is a property that companies are especially interested in and willing to pay				
Plans					
Iowa State University	Project			Allocated Dollars FY 2007	
	Jay-Lin Jane, Principal Investigator			\$96,273	
Description of Project	Development of Resistant and Low-caloric Maltodextrins from Cornstarch				
Anticipated End Results					
Results achieved to Date	<p>A novel technology was developed to produce resistant maltodextrins from normal cornstarch. A series of resistant maltodextrins were produced by using different reaction conditions and reagents. One example of the product consisted of 52.4% resistant starch and about 3% slow-digestible starch as measured by in vitro enzymatic analysis. The product displayed a tan color, gave lightly caramel flavor, and had a bland taste. The resistant maltodextrin was 78.7% water soluble at 35% weight/volume dispersion. Average molecular weight of the product was 7.2×10^3 Dalton, equivalent to 44.5 anhydroglucose units. Glycosidic linkages of the resistant maltodextrins were elucidated using ¹³C-nmr. The product was made into a beverage and used for a human feeding study. Twenty healthy free-living adult men, 18-45 years of age, were recruited to participate in the human feeding study.</p> <p>Results of the human feeding study showed that after ingesting the resistant maltodextrin product, the average blood glucose concentration of the human subjects was 62.9% of that obtained after ingesting a regular maltodextrin product (Maltrin M180) as the reference of 100%. The blood glucose concentration profile recorded from 0 to 240 minutes after ingesting the resistant maltodextrin product also showed a slow glucose-release peak up to 90 minutes, indicating the product consisting of slow-digestible maltodextrin.</p> <p>The slow-digestible characteristic of the product is highly desirable as a health food ingredient. Because of these desirable properties of the product, the industry partner is in the process of conducting further studies of the product for potential commercial applications.</p>				
Plans					

Iowa State University	Project		Allocated FY06	Allocated Dollars FY 2007
	David Grewell, Principal Investigator		\$24,395	\$48,282
Description of Project	Ultrasonic Assisted Exfoliation of Bio-Renewable Polymer Nanocomposites with Micro-Cellular Structures			
Anticipated End Results				
Results achieved to Date	This was an 18 month research project that had the goal of developing protein-based (corn and soy) plastics reinforced with nanoclays, for cost reduction and mechanical property enhancement. Applications for these materials range from packaging materials to automotive body panels. High powered ultrasonication will be used to overcome the obstacle of fully exfoliating and dispersing the nanoclay platelets in the polymer matrix. We demonstrated several applications and worked with Iowa Companies to test their performance. For example, Creative Composites of Brooklyn, IA, tested lubrication sticks that were formulated from 100% bio-based ingredients. The results were promising and the company plans further product testing. In addition, planting pots design, fabricated and currently being tested. These pots rapidly decompose in the soil and release natural nutrients into the soil that promote plant growth. Vermeer Manufacturing Co. of Pella IA is currently testing corn protein based hay bale wrapping. In addition, to product development, this project resulted in the publication of one journal article 8 peer reviewed conference paper, 7 international presentations and 3 domestic presentations. This project also resulted in nearly \$750,000 of funded research.			
Plans				
Iowa State University	Project		Allocated FY08	Allocated Dollars FY 2007
	Robert Brown, Principal Investigator		\$37,705	\$94,569
Description of Project	Gasification Technologies in Support of Biorefineries			
Anticipated End Results				
Results achieved to Date	The current period has focused on completing the 2D and 3D CFD simulations using biomass particles in a fluidized bed and comparing the time-averaged gas fraction predictions to our imaging data. In general, the simulations do a good job of predicting the experimental results. This work has been summarized in several conference papers (see above) and will be included on one more journal publication. CFD simulations that captured the pressure fluctuations within the fluidized bed have also been completed during the current period. These data will be analyzed during the next period to determine if this information can be used to predict fluidized bed hydrodynamics. A ThermoStar mass spectrometer was purchased from Pfeiffer Vacuum and has been installed to analyze producer/syngas contamination levels. The mass spectrometer instrument has been calibrated with the following matrix of gases for quantitative analysis: Hydrogen Sulfide, Hydrogen Chloride, Ammonia, Sulfur Dioxide, Methane, Carbon Dioxide, Carbon Monoxide, Hydrogen, Nitrogen, Ethylene, and Ethane. This matrix contains the primary constituents of the producer/syngas gas stream after the water and organic tars have been removed. Shake down trials have taken place in Black Engineering on the 5 kg/hr gasifier and mass spectral data was recorded on December 17th during an oxygen steam gasification trial. The data has been analyzed and will provide more information on the contaminants in the gas stream.			
Plans	Over the next period, we will be comparing 2D and 3D simulations for biomass particles and compare the simulations to our imaging data. We will also be evaluating producer gas emissions during the next period.			
Iowa State University	Project		Allocated Dollars FY 2007	
	Jacek Koziel, Principal Investigator		\$81,848	
Description of Project	Purification and Quality Enhancement of Fuel Ethanol to Produce Industrial Alcohols with Ozonation and Activated Carbon			
Anticipated End Results				
Results achieved to Date	We developed a novel process for ethanol purification utilizing ozonation, granular activated carbon (GAC) adsorption, and gas stripping. This process is capable of purifying fuel grade ethanol to industrial, pharmaceutical, and beverage grades. This process addresses many of the disadvantages of traditional distillation. The approximate cost of treatment is < \$0.005/gallon. The following was accomplished since the last report: M.S. thesis based on this research was defended and deposited with ISU; Two national-conference presentations based on this work were made; Three manuscripts for peer-reviews have been in various stages of preparation with the goal of submitting them by August 15, 2008; Research proposal to the GVP program titled "Purification and quality enhancement of ethanol by inexpensive means" was submitted by Jenks and Koziel; Research proposal to the ISU-Sloan Bio-based Products Industry Center Seed Grants Program titled "Optimization of ethanol purification and process-based cost analysis of ozonation, granular activated carbon and gas stripping as an alternative to distillation" (by Koziel, van Leeuwen, Jenks) was submitted; Presentation of results was made to the GVP on June 3, 2008; Presentation of results was made to the GPC in Muscatine, IA, May 2008.			
Plans				
Iowa State University	Project		Allocated FY06	Allocated Dollars FY 2007
	Hans Van Leeuwen, Principal Investigator		\$52,120	\$29,874
Description of Project	Converting Low Value Thin Silage from Dry Milling Ethanol Plants into High Value Fungal Biomass			
Anticipated End Results				
Results achieved to Date	Bioreactors were operated to treat thin stillage, the centrate of the distillation leftovers from a dry-grind ethanol plant, Lincolnway Energy with fungi. The aerated reactors were inoculated with spores of Rhizopus oligosporus. Tests were conducted with an airlift reactor, in which the diffused air itself causes the water and fungi to rise in a draft tube inside the reactor with continuous water recycle in the annulus between the reactor wall and the draft tube. This was done in order to satisfy the oxygen requirements more rapidly. This caused the fungi to grow to large densities within two days and also to grow into pellets, which are denser and readily harvested with mesh screens. Another reactor was developed and built with external recirculation to avoid problems of fungal biomass attachment. Mycelial growth was visible within two days after inoculation. The total organic concentration of the thin stillage, characterized as chemical oxygen demand (COD) of 94 g/L, was lowered by 60 to 80%. Continuous operation could achieve up to 93% COD removal. Total suspended solids in the samples decreased from 30 to less than 0.1 g/L. Water from thin stillage could be recovered without evaporation. The fungal biomass has a protein content of 38% and contains high levels of lysine and methionine, making the fungal biomass suitable for monogastrics. The results were used to show that substituting the current process of evaporating thin stillage with the fungal process would save 18c/gal ethanol produced and another 2c on water and enzyme recycling. Another 7.5c income per gallon could be expected from the fungal biomass as animal feed. Allowing for capital amortization and operational cost, the net savings and income would be about 18c/gal ethanol with a payback on investment of 6 to 8 months.			
Plans				

Iowa State University	Project		Allocated FY08	Allocated Dollars FY 2007	
	Pamela White, Principal Investigator		\$6,400	\$61,909	
Description of Project	Designing Corn Lines with Dietary fiber to Produce Ethnic Foods with Enhanced Health Benefits				
Anticipated End Results					
Results achieved to Date	<p>Aim #1. Develop specialty corn lines with high resistant starch (RS) for the U.S. Corn Belt. Specialty corn lines with properties ideal for use in native Hispanic foods were previously planted and crossed with corn lines containing high amounts of resistant starch (RS) as a dietary fiber. These lines include corn types with different numbers of mutant amylose-extender (ae) and floury-1 (f1) alleles. In summer/fall 2008, our commercial partner, Dr. Alix Paez, Genetic Enterprises International (GEI), continued to develop these lines to increased corn yields. The lines were self pollinated during summer 2008 to create lines with fixed starch properties, and harvested in fall 2008, with enough material for evaluation as noted in aim #3.</p> <p>Aim #2. Characterize the new lines for basic composition and potential RS. The RS % in the original starches were: #1, aeae, 54.6%; #2, flfl1D1, 1.1%; #3, aeae11, 5.1%; and #4, flfl1ae, 1.9%. Starch from corn types having more amylose (ae) genes (#1 and #3) also had greater amounts of the longer chain lengths in the starch molecules. Alternatively, starch from corn types having more floury (f1) genes (#2 and #4) had greater percentages of the smaller chain lengths. The RS from all starch types were evaluated, and were determined to have no amylopectin (branched-chain) or high molecular weight amylose molecules present, affirming the importance of corn starch having high amounts of low molecular weight amylose to produce greater amounts of RS and thus, fiber, for various food applications.</p> <p>Aim #3. Evaluate the functional and sensory properties of flours from the new corn lines. Procedures for dry milling the new corn lines in the Center for Crops Utilization Research (CCUR) pilot plant were developed. The resulting flours, containing varied amounts of the RS dietary fiber are being evaluated in tortillas by using sensory and objective tests.</p>				
Plans					
Iowa State University	Project		Allocated FY06	Allocated Dollars FY 2007	
	Richard Larock, Principal Investigator		57,409.41	\$38,591	
Description of Project	Commercialization of a Corn/Soy Oil-Based Composite Hog Feeder				
Anticipated End Results					
Results achieved to Date	<p>We have developed a commercially viable vegetable oil resin and corresponding biocomposites for use in a hog feeder or other commercial possibilities. The composition of the soybean /corn oil-based resin, the ratio of resin to glass fibers, the cure kinetics and the processing conditions have all been carefully investigated. We have successfully obtained very hard composites from several different bio-based resins reinforced with 45-55 wt % glass fibers. The bio-based resins contain at least 50 wt % of soybean, corn or linseed oils. The mechanical properties of the biocomposites meet the requirements for a viable hog feeder and other commercial applications. We have dramatically shortened the cure time of the composites from 24-48 hr to just a few minutes with no reduction in the thermal and mechanical properties. These times are suitable for a commercial molding process.</p> <p>We have also developed high performance vegetable oil-based resins by ring opening metathesis copolymerization. The composition of the resins, the cure time and temperature, the amount of catalyst, and the properties of these resins have been investigated. The Young's modulus and tensile strength reach 650 MPa and 21 MPa, respectively. Glass fiber reinforced biocomposites have also been prepared by a composite molding process. These biocomposites show excellent mechanical properties.</p> <p>The tensile strength and Young's modulus of the composites reinforced with 40 wt % glass fiber reach 150 MPa and 1545 MPa, respectively.</p>				
Plans					
Iowa State University	Project			Allocated Dollars FY 2007	
	Suzanne Hendrich, Principal Investigator			\$66,960	
Description of Project	Flaxseed Lignans for Heart Health				
Anticipated End Results					
Results achieved to Date	The human feeding study of a flaxseed lignan supplement began with the first cohort of 24 individuals in December 2007, after 4 months of subject recruitment and screening. An additional cohort of 21 subjects completed the trial in April 2008, with 17 completing the study in Dec 2008. To date 58 subjects have completed the trial, with another cohort of 32 to begin in January 2009, with the trial completed by April 2009 with at least 90 subjects completed. Subjects' blood lipids, glucose, and blood biomarkers of treatment compliance, as well as blood pressure and dietary records are under analysis.				
Plans					
Iowa State University	Project		Allocated FY08	Allocated Dollars FY 2007	
	Ruth MacDonald, Principal Investigator		21,000	\$44,000	
Description of Project	Role of complex Carbohydrates on Colon Health				
Anticipated End Results					
Results achieved to Date	To date we have established a protocol for inflammatory bowel disease (IBD) in mice that provides a suitable model for the human disease. We have used the model to study dietary interventions to reduce the severity of inflammation. In addition, we are developing techniques to quantify cellular events associated with the model. This includes several cytokines to be measured using the Luminex system, Western immunoblotting and ELISA. In addition, we plan to screen for global protein expression changes using 2-D electrophoresis. Through these studies we will identify potential mechanisms through which dietary factors may reduce the symptoms of inflammatory bowel disease. Our goal is to complete these studies by May 2010.				
Plans					

Iowa State University	Project			Allocated Dollars FY 2007	
	Anumantha Kanthasamy, Principal Investigator			\$50,000	
Description of Project	Development of Novel Gene therapy Approach for Parkinson's Disease				
Anticipated End Results					
Results achieved to Date	<p>The overall objective of our project is to develop a gene therapy approach for Parkinson's disease by targeting the cleavage site of a proapoptotic kinase PKCα. As reported in our previous biannual report, we first developed lentiviruses coding for the PKCα cleavage motif tripeptide peptides QDAM3, DMQD3 and DMQA3, and tested their transfection efficiency in cell culture and animal models of Parkinson's disease. We found that lentiviral vector-mediated expression of the peptide sequences worked well in cell culture models, but the expression was very low when injected in animal models. To overcome this problem, we tested Adeno Vector AAV2-1CMV-eGFP from the Gene Transfer Vector Core (GTVC) facility (University of Iowa). This adenoviral-mediated delivery into the mouse SN also did not yield sufficient expression. Next, we cloned DMQD3 and DMQA3 into BamHI and MluI sites in the PLVPT-CTR-KRAB vector obtained from Addgene.org. This inducible vector has been previously used for long-term expression of recombinant proteins in the CNS in a tetracycline-regulatable manner without producing toxicity. We have produced the viruses coding for the LacZ, DMQD3, DMQA3 and QDAM3 in HEK 293-FT cells. We tested their efficiency in cell culture models before proceeding to animal models. This vector showed a low level expression in 293 cells, but not enough expression in dopaminergic neuronal cell model. We are now testing whether higher concentrations of virus will increase the efficiency of the vector.</p> <p>We have also started a collaborative arrangement with Prof. Tusanya Ikezu at the University of Nebraska Medical Center to adopt AAV1/2 hybrid viral vector in our studies. Recently, Dr. Ikezu's group has used this vector in an animal model of Alzheimer's disease. We already tested the AAV1/2 GEP in cell culture models and animal models. The preliminary results are quite promising, and we are in the process of obtaining appropriate plasmids from the Gene Therapy Program at the University of Pennsylvania for cloning QDAM3, DMQD3 and DMQA3 in the AAV1/2 vector.</p> <p>After the completion of cloning, we will test in animal models to determine efficacy of this hybrid vector based gene therapy.</p>				
Plans					
Iowa State University	Project			Allocated Dollars FY 2007	
	Don Reynolds, Principal Investigator			\$38,000	
Description of Project	Modular BL3 Facility at Veterinary Medicine.				
Anticipated End Results					
Results achieved to Date	To date, funds have been expended on the planning of the BL3 modular laboratory. This planning has resulted in various sites being considered for the BL3 at the VMRI and at the Vet Med complex. It was revealed that VMRI is at capacity with regard to utilities and adding more facilities is not possible without major expansion of infrastructure. However, due to the City of Ames needing to expand electrical infrastructure the project can now be sited at the VMRI. The planning has now been completed and approvals from the University and the Board of Regents have been sought and obtained. The project is being bid and it is anticipated that construction will begin in the fall of 2008 with completion in the following spring.				
Plans					
Iowa State University	Project			Allocated Dollars FY 2008	
	Johnny Wong, Principal Investigator			\$100,397	
Description of Project	Quality Assessment Tools for Colonoscopy				
Anticipated End Results	To enhance and integrate proof-of-concept software for objectively measuring the quality of colonoscopy and to test its value in a high volume, world-class colonoscopy practice in preparation for commercialization.				
Results achieved to Date	<ol style="list-style-type: none"> Two systems were installed at two endoscopy rooms at University of Iowa Hospital. We continue our ongoing collaboration with two physicians at UI. We are in the final testing phase for the first version of the automated analysis software for quality of colonoscopy. We applied for external funding as listed above. Our proposal for the NSF STTR Phase IB was recommended for funding. We are waiting to receive the grant money. The installation of our systems at IDDC was put on hold as IDDC and EndoMetric are not able to reach an agreement on the terms for software testing. We continue to test and develop better algorithms and metrics to quantify the amount of the colon mucosa seen by the endoscopist during the procedure. We continue to prepare our proposal for the NSF STTR Phase II, which is due in Summer 2009. This grant will significantly help with further technology commercialization and business development. 				
Plans					
Iowa State University	Project		Allocated FY07	Allocated Dollars FY 2008	
	Ann Somani, Principal Investigator		\$ 34,669.50	\$61,535	
Description of Project	Work with EnSoft to develop the next generation of SimDiff, a tool for differencing control software models.				
Anticipated End Results	EnSoft, an ISU based software tools company at the ISU Research Park, has developed an innovative tool for users of Simulink software. Simulink is a software modeling tool widely used for developing control systems. EnSoft's tool, SimDiff, analyzes Simulink software models and presents the results in an easy-to-comprehend visual form. The SimDiff tool has huge potential for commercialization because of the vast proliferation of software enabled control. Control software is everywhere – in thermostats, watches, cell phones, microwave ovens, cars, tractors, pacemakers, airplanes, spacecrafts, and so on. Control software continues to be harnessed to achieve more functionality and efficiency.				
Results achieved to Date	<p>This is a follow-up project. The first GIVF project was aimed at enhancing the SimDiff product from EnSoft. This GIVF project is aimed at creating another product with the eventual goal of building a product family for developing highly reliable control systems software. The project has resulted in following:</p> <ul style="list-style-type: none"> - We have built a testbed for testing graph differencing algorithms and we are conducting experimental studies. - Using our research, EnSoft has built a prototype tool and obtained feedback from several companies. EnSoft has identified companies in USA for beta testing and the testing is expected to begin in the first quarter of 2009. - The SimDiff tool is now licensed by 73 companies in 9 countries. 				
Plans					

Iowa State University	Project			Allocated Dollars FY 2008	
	Brad Bosworth, Principal Investigator			\$82,437	
Description of Project	Viral replicon particle discovery research for development of improved vaccines for swine				
Anticipated End Results	To prove the efficacy of RS and RP vaccines in swine and position Sirrah, LLC as a credible choice for an exclusive field of use license for economically important diseases of swine.				
Results achieved to Date	One study was conducted utilizing replicon particles expressing a single antigen. Post-vaccination immune responses were weak, suggesting inadequate antigen exposure. Following challenge with virulent virus, there were no differences between vaccinated and non-vaccinated animals. The dose of replicon particle vaccine used in this study was lower than in previous work, which may have contributed to the lack of immune response. Currently, the same replicon particle vaccine is being evaluated at higher doses to find the optimal dose. After one dose of vaccine, pigs receiving higher doses than the first study showed a specific immune response by Western blot. This indicates that a relatively high dose of replicon particle vaccine may be required to induce protective immunity.				
Plans					
Iowa State University	Project			Allocated Dollars FY 2008	
	Jay-Lin Jane, Principal Investigator			\$66,960	
Description of Project	Resistant and slowly digestible starch from cornstarch through ingredient processing				
Anticipated End Results	To develop a commercial food product with slowly digestible starch				
Results achieved to Date	Normal cornstarch and partially acid-hydrolyzed normal cornstarch were subjected to batch cooking and drying to produce resistant and slowly digestible starch. The cooked normal cornstarch consisted of 26.2% resistant-starch and 11.4% slowly digestible starch, whereas the cooked acid-modified starch consisted of 32.7% resistant-starch and 8.2% slowly digestible starch. Both cooked normal cornstarch and acid-modified cornstarch were subsequently treated at a high-temperature of 110°C for three days. The resistant starch content of the heat-treated normal cornstarch increased to 32.9%, whereas that of the treated acid-modified cornstarch slightly decreased to 31.4%. These results showed that partially acid-hydrolyzed starch, which had smaller molecular weight, retrograded faster than the normal cornstarch to form resistant starch. The acid-modified cornstarch required less water content than did the normal cornstarch to develop resistant starch. The cooked normal cornstarch produced more resistant starch when it had moisture content greater than 70%. The acid-modified cornstarch was also subjected to extrusion cooking, and the extrudate was processed with and without manual stretching. The extrudate samples were analyzed for their resistant starch contents and their crystallinity using X-ray diffractometry.				
Plans					
Iowa State University	Project		Allocated FY07	Allocated Dollars FY 2008	
	Jay-Lin Jane, Principal Investigator		75,120.34	\$74,440	
Description of Project	Enzyme hydrolysis of uncooked dry-grind corn for ethanol production				
Anticipated End Results	Improved production yield of ethanol from dry grind corn				
Results achieved to Date	Fifteen selected corn lines were used for ethanol yield study. After 96 h fermentation, the ethanol yield varied from 17.9% to 19.4%, and the conversion efficiency of starch to ethanol varied from 88.1% to 93.7%. The conversion efficiency is directly related to the structure, properties, and digestibility of starch, whereas the ethanol yield is depending on both the starch content of the corn and the enzyme digestibility of the starch. Delays on planting corn caused by bad weather are known to result in decrease in corn yield, but it is not known how it may affect corn quality and starch properties. To understand how the late-planted corn may affect the yield of ethanol production on the same mass basis, we analyzed quality of corn planted on different dates from early to late May in 2008. Results showed that the starch content of corn was the largest for corn planted on May 11, and the ethanol production was faster with corn planted in early May. Starch hydrolysis rate was also affected by the drying temperature of corn grains. Starch of corn kernels dried at a higher temperature (e.g., 85°C) was hydrolyzed more slowly than that dried at the ambient temperature. NIR spectrometry has shown promising results on predicting the ethanol yields.				
Plans					
Iowa State University	Project			Allocated Dollars FY 2008	
	Suzanne Hendrich, Principal Investigator			\$18,594	
Description of Project	Human feeding study of a novel dietary fiber				
Anticipated End Results					
Results achieved to Date	The human feeding study of a novel dietary fiber was completed Dec. 16, 2007. The trial consisted of 3 feeding periods of 14 days each, with a randomized crossover design, 12 subjects, 4 on each treatment (control, wheat bran, test fiber) during each feeding interval. All subjects completed the trial. Mean daily fecal weights, gut transit time, gastrointestinal symptoms, blood glucose response, 3-day food records and fecal calcium compared with dietary calcium are under study. Breakfast bars containing 15 g of dietary fiber were formulated and prepared, as well as a low fiber control. One bar of each type was consumed daily during each feeding period. When g wet fecal weight changed dietary fiber added compared with the control breakfast bar was contrasted between corn and wheat bran, the two treatments did not differ significantly in their effect. Dietary fiber intakes of subjects were significantly increased by the addition of high fiber breakfast bars to their daily diets, with no adverse effects on gastrointestinal function. The lack of effects of either dietary fiber source on blood glucose after a 50 g glucose challenge is consistent with the literature, but such fibers may exert other diabetes preventive effects that deserve further study. This trial supports the ability of corn bran to function as a dietary fiber similar to wheat bran.				
Plans					
Iowa State University	Project		Allocated FY07	Allocated Dollars FY 2008	
	Toni Wang, Principal Investigator		\$6,400	\$107,100	
Description of Project	Oil Recovery from corn fermentation by-products				
Anticipated End Results	Obtaining Oil from Corn Ethanol fermentation co-products				
Results achieved to Date	Breaking the corn to smaller pieces did not cause more oil to go to the liquid fraction, which is what we intended to do so the oil can be separated by centrifugation. Extrusion, however, did release more oil from the cellular structure and made it more extractable by solvents but not by centrifugation. For down-stream oil extraction (once oil is in liquid phase), enzymatic hydrolysis and heating with gentle stirring (churning) are relatively effective to recover the oil. Further modifications of corn processing and fermentation are shown to be effective in recovering the oil and the new processes also resulted in co-products with higher purity than with conventional processes.				
Plans					

Iowa State University	Project			Allocated Dollars FY 2008
	Mike Wannemuehler, Principal Investigator			\$150,444
Description of Project	Generation X vaccines: combining novel antigens and single dose delivery technologies			
Anticipated End Results				
Results achieved to Date	<p>The goals of this project are to develop a novel vaccination strategy using polyanhydride-based biodegradable polymers and aGal-modification of the vaccine candidate. This goal of the project is to develop a vaccine regimen that will induce protective immunity following immunization with a single dose vaccine that will improve patient compliance. The project focuses on the use of a recombinant protein (rF1-V) derived from Yersinia pestis, the causative agent of plague. For a vaccine to effectively induce protective immunity, cells of the immune system referred to as antigen-presenting cells (APC) must take up the vaccine material, process the antigen, and present it to T cells and B cells for the induction of immunity. During the past six months, we have evaluated the ability of polyanhydride nanoparticles or microparticles to be taken up by APCs. Using laser scanning confocal microscopy, we have evaluated the interactions of the polyanhydride particles with both human and mouse APCs. Polyanhydride nanoparticles composed of poly(sebacic anhydride) (SA), and 20:80 and 50:50 copolymers of 1,6-bis-(p-carboxyphenoxy)hexane (CPH) anhydride and SA were fabricated with similar spherical morphology and particle diameter (200 to 600 nm).</p> <p>Exposure of the nanospheres to APCs showed that poly(SA) and 20:80 CPH:SA nanospheres were readily internalized whereas 50:50 CPH:SA nanospheres had limited uptake.</p> <p>The chemistries also differentially enhanced the uptake of an antigen which lends to the observed adjuvant activity of the polyanhydrides.</p> <p>These studies demonstrated that nanosphere and antigen uptake by monocytes (i.e., APCs) can be directly correlated to the chemistry of the nanosphere.</p> <p>These results demonstrate the importance of choosing polyanhydride chemistries that facilitate enhanced interactions with antigen presenting cells that are important in the initiation of efficacious immune responses.</p> <p>In addition to these studies, a novel combinatorial method to prepare nanoparticles was developed.</p> <p>This method will facilitate the preparation of nanoparticles of multiple chemistries (i.e., ratios of CPH to SA) in which the vaccine antigen will be incorporated.</p> <p>This will 1) reduce the amount of aGal-modified protein required for polymer fabrication and 2) facilitate the evaluation of multiple vaccine formulations.</p>			
Plans				
Iowa State University	Project		Allocated FY07	Allocated Dollars FY 2008
	Eliot Winer, Principal Investigator		\$50,135	\$59,400
Description of Project	Commercialization of a 3D interactive digital medical software for surgical planning and training			
Anticipated End Results	Commercial application for surgical planning and training			
Results achieved to Date	<p>All of the project budget is a subaward to Visual Medical Solutions, LLC. (VMS). Here are the milestones completed by VMS in the past six months:</p> <ul style="list-style-type: none"> • Hired Curt Carlson as President/CEO of company. • Awarded Wellmark venture funding in the amount of \$100,000. • Beta testing BodyViz software at several partner sites including: <ul style="list-style-type: none"> o Stryker Medical o Des Moines University Medical School o Texas Methodist Hospital System • VMS presented BodyViz to venture capitalist forum organized by Steve Carter. Follow-ups are currently being pursued. • Negotiating agreement with Med-Tech Consultant Partners, LLC for East coast distribution. • BodyViz chosen as platform for earmark research project for Marshalltown Medical Center. Proposal facilitated by Mechdyne Corporation. 			
Plans				
Iowa State University	Project			Allocated Dollars FY 2008
	Haili Ceylan, Principal Investigator			\$93,775
Description of Project	Ethanol Plant by-product uses for pavement geomaterials stabilization			
Anticipated End Results	Utilization of DDG's for pavement stabilization			
Results achieved to Date	<p>During this period, the research efforts mainly focused on obtaining the bio-oil/lignin test materials and studying the engineering property of these materials. Potential lignin samples have been obtained by contacting industry (Dynamotive Energy Systems, Inc. and Grain Processing Corporation of Muscatine, Iowa, Inc.) and Iowa State University's biofuel research labs. The research team consulted the Iowa Department of Transportation engineers to identify potential soil types which will benefit from lignin treatment both from structural and economic perspectives. The research team collected the identified potential soil materials from new construction site near US 20 in Calhoun County, Iowa. The research team has characterized the engineering properties of obtained soil materials through national standard laboratory specifications including Grain size distribution (AASHTO T 27), Atterberg's limit test (AASHTO T 89/90) and the Moisture/density relationship (AASHTO T 99). Preliminary test factorials have been completed to study the lignin-soil/aggregate mixtures and to examine the effect of lignin addition on the strength and overall engineering characteristics of the lignin-soil mixtures. Preliminary test results gave very encouraging results in terms of using the bio-oil/lignin samples for soil geomaterial stabilization purposes.</p> <p>Future research will focus on optimizing the test parameters (additive concentration level, moisture content, curing time, etc.) for achieving maximal performance in terms of lignin/bio-oil - soil stabilization.</p>			
Plans				
Iowa State University	Project			Allocated Dollars FY 2008
	Terry Meyer, Principal Investigator			\$86,814
Description of Project	Laser-based diagnostics of next generation combustion systems			
Anticipated End Results	New system for evaluating and diagnosing problems with combustion systems			
Results achieved to Date	<p>We are building up the facilities and instrumentation that will allow us to develop advanced laser-based sensors for analyzing combustion systems that burn alternative fuels. The end product will be improved combustion sensors and improved combustor designs given detailed knowledge of alternative fuel sprays, fuel-air mixing, and energy release. Below is an update on tasks required for this work.</p> <p>Task 1. Install laser systems for achieving narrowband, tunable radiation. This task has been completed in Q3 of 2008 as planned. It includes the following accomplishments: (a) demonstration measurements of soot and combustion species within the flame zone of a biofuel combustor and (b) extension to high-speed measurements at rates up to 20,000 frames per second.</p> <p>Task 2. Acquire detection hardware, including photodetectors and imaging systems. This task has been completed in Q4 of 2008 as planned. It includes the acquisition of special cameras for recording flame data and photodetectors for tracking particulates and signals from fuel sprays. A second camera is being acquired to allow simultaneous recording of multiple parameters.</p> <p>Task 3. Assemble and characterize measurement system for studying multiple combustion parameters. This task is underway, with measurements of multiple parameters being completed using lasers and detection systems described above. Simultaneous acquisition of multiple parameters will be completed when another camera is acquired by Q1 of 2009 as planned.</p> <p>Task 4. Assemble test apparatus and study two-phase combustion processes using alternative fuels. This task is the payoff for the efforts described above. It is underway and will continue into Q1-Q3 of 2009. Thus far a bio-fuel combustor has been constructed and is undergoing testing, and a diesel spray chamber has also been constructed and is undergoing testing. Both will be used for studies of alternative fuels using the instrumentation described above.</p>			
Plans				

Iowa State University	Project			Allocated Dollars FY 2008	
	Stephen Gilbert, Principal Investigator			\$100,000	
Description of Project	Multi-touch technology: application to homeland security and ISU research				
Anticipated End Results	Open a new market for P5 (previously infiscape) in the area of homeland security				
Results achieved to Date	<p>Launch of Sparsh-UI 1.0</p> <p>With guidance from Priority 5, the ISU team developed Sparsh-UI, and open source platform that supports multitouch software development across systems, e.g. Windows, Mac, Linux. It can also accommodate different languages, e.g. C++ or Java. Sparsh-UI 1.0 was placed in Google Code in October 2008, and as of January 2009 there have been over 700 downloads worldwide. This fact illustrates that Sparsh is a worthwhile platform, and discussions continue with P5 about how to tweak it so that it would be fully usable out of the box by P5 in their commercial products. The target for this advance is Spring 09.</p> <p>Usability Analysis and Interface Prototyping</p> <p>We also worked with P5 to help them design a new interface for their TACCS software. The usability analysis at ISU was helpful to P5 so that it could continue focusing on implementation. The multitouch hardware market continues to be problematic, e.g. it's hard to be good multitouch hardware off the shelf. P5 and ISU compare notes on what they can find.</p>				
Plans					
Iowa State University	Project			Allocated Dollars FY 2008	
	Guru Rao, Principal Investigator			\$70,000	
Description of Project	Development of Novel Digestion-Resistant Starches from Corn to Combat Human Disease				
Anticipated End Results	Develop food products with slowly digested starch				
Results achieved to Date	<p>Previous laboratory analyses of starch from genetically modified corn plants producing a long-chain amylopectin starch (LCAPS) show it is enzymatically converted to glucose more slowly than normal cornstarch (60% of normal rate). Current objectives are to analyze the digestion properties of new starches based on LCAPS, and to demonstrate that incorporation of these modified starches into food will result in protracted release of glucose into the bloodstream in humans.</p> <p>Approaches: 1) Genetically modified LCAPS corn lines that were crossed to the mutant lines amylose extender and dull1 to produce novel starches termed LCAPS2 and LCAPS3, respectively, were analyzed to determine starch fine structure and digestibility to glucose by hydrolytic enzymes over time. 2) New food products were designed and laboratory tested for use in human feeding trials. These include a corn flour based cookie, corn bread, and an arepa-type food product.</p> <p>Accomplishments: 1) LCAPS3 is near final characterization. This modified starch has a different structure compared to LCAPS, with more long chains. Both modified starches are less viscous than normal starch. Analyses indicate LCAPS3 has a higher gelatinization temperature, and is digested to glucose more slowly than LCAPS or normal starch. This suggests LCAPS3 has promise as a slow energy release food ingredient.</p> <p>Scanning electron microscopy of LCAPS and LCAPS3 granules showed both are smaller than normal, and have narrower granule size distributions and smoother surfaces.</p> <p>These features may confer properties of interest for certain food applications.</p> <p>Characterization of LCAPS2 is in progress. 2) Food product development is in progress for human feeding trials, including analysis of starch concentration and time of storage.</p> <p>Laboratory analysis of corn flour based cookies showed the LCAPS cookie was not digested more slowly than the cookie containing normal corn flour.</p> <p>Consequently, research currently is focused on alternative food products containing fewer non-starch ingredients.</p>				
Plans					
Iowa State University	Project			Allocated Dollars FY 2008	
	Marian Kohut, Rick Sharp, Principal Investigators			\$92,777	
Description of Project	Effectiveness of EpiCor in improving immune function, inflammation, and performance after intense exercise				
Anticipated End Results	Demonstrate that EpiCor decreases recovery time after intense exercise and provides enhanced immunity				
Results achieved to Date	All subjects have been recruited and participated in the exercise treatment. Blood samples have all been collected. Approximately 75% of all blood assays have been completed. Remaining blood assays are due for completion in spring 2009. A preliminary data analysis has begun on the assays that have been completed.				
Plans					
Iowa State University	Project			Allocated Dollars FY 2008	
	Charlie Hurburgh			\$51,450	
Description of Project	Automated phenotyping of biomass crops - part I				
Anticipated End Results	Development of a rapid phenotype screening system to increase selection and development of biomass crops.				
Results achieved to Date	No update was provided				
Iowa State University	Project			Allocated Dollars FY 2008	
	Lie Tang			\$52,180	
Description of Project	Automated phenotyping of biomass crops - part II				
Anticipated End Results	Development of a rapid phenotype screening system to increase selection and development of biomass crops.				
Results achieved to Date	<p>The primary objective of this project is to design and control a plant screening station, which eventually will help researchers in collecting phenotype related data with minimal human intervention in a greenhouse environment. Plants are carried to the station on conveyor belt. Each plant is attached with a Radio Frequency Identification (RFID) tag. Once the plant reaches the center of the screening station, the conveyor belt stops, an RFID antenna identifies the plant, and a camera starts capturing images of the plant. The camera is attached to a lead-screw which is rotated with the use of a stepper motor, which in turn defines the vertical position of the camera. On the other hand, the lead-screw is also connected by a horizontal arm to another motor, which is used to rotate the whole inverted L-shaped structure, and defines the circular position of the camera. The system worked satisfactorily. Both the DC motor and stepper motor were controlled as desired. But because of lack of braking system, the motor could not be stopped as required and there was undesirable back and forth movement after the motor was stopped. On the other hand, the stepper motor had a nice feature that allowed us to set the number of steps or pulses after which the motor would stop automatically.</p> <p>We will keep developing this screening station platform development.</p> <p>In particular, we will investigate the option of rotating plant instead of rotating the camera.</p> <p>In the meantime, we have developed a basic software platform that allows us to capture 3D images in a synchronized fashion with external positioning sensors such as encoder.</p> <p>We have also incorporated RFID system into the registration of plant tags.</p>				

Iowa State University - as of December 31, 2009
 Grow Iowa Values Fund Appropriations

- 1 Commercialization Infrastructure and Campus-Wide Entrepreneurial Culture
- 2 Commercialization Program

FY 2009 GIVE Appropriation **\$1,520,000** Board of Regents approved August 2008
 \$684,500 Reflects 20% reduction
 \$835,000 due to state disaster reallocation

Iowa State University	Project	List of all FY 2009 Revenue Sources	Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
1	Commercialization Infrastructure and Campus-Wide Entrepreneurial Culture	FY 2009 State Appropriations (GIVE) FY 2009 Matching Funds (General Fund) FY 2009 Matching Funds (In-Kind) FY 2009 Matching Funds (Other)	\$684,500	\$527,295 \$386,335 \$325,500
Description of Project		See individual projects		
Anticipated End Results				
Results achieved to Date				
Plans				
Iowa State University	Project	List of all FY 2009 Revenue Sources	Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
2	Commercialization Program	FY 2009 State Appropriations (GIVE) FY 2009 Matching Funds (General Fund) FY 2009 Matching Funds (Federal Support) FY 2009 Matching Funds (Cash) FY 2009 Matching Funds (In-Kind)	\$835,500	\$519,896 \$379,026 \$18,033 \$138,758 \$152,851
Description of Project		See individual projects		
Anticipated End Results				
Results achieved to Date				
Plans				
Iowa State University	Project	Allocated Dollars FY 2010	Allocated Dollars FY 2009	Total Project Budget
	Michael Kessler	\$28,275	\$11,725	\$40,000
Description of Project		Protruded Window Frames from Agricultural Oils		
Anticipated End Results		To develop resins and composites for pultrusion manufacturing to produce fiberglass reinforced biorenewable composite window frames.		
Results achieved to Date		We are making good progress in developing a resin formulation for the pultrusion processing of fiberglass-bio-resin composite window frames. Our efforts have focused primarily on two areas. The first effort has been directed at decreasing the cure times and characterizing the cure kinetics of the resins made by the cationic polymerization of soybean oil, styrene, and divinylbenzene. The second effort has been directed at increasing the interfacial shear strength (IFSS) between the glass fiber and ring-opening metathesis polymerization (ROMP)-based matrix using a silane coupling agent. For the cationic polymerized system, we have been investigating the cure times for systems with unmodified soybean oils and conjugated soybean oils, with different loadings of the styrene and divinylbenzene co-monomers. The room temperature gel times vary from 35 to 70 min while the gel times at 160 °C vary from 40 to 80 s, depending on composition. The effect of catalyst blending sequence was also investigated. For the ROMP-based system, we have quantified the contact angle reduction for the glass treated with the silane coupling agent and qualitatively demonstrated significant enhancements in interfacial shear strength.		
Plans				
Iowa State University	Project	Allocated Dollars FY 2010	Allocated Dollars FY 2009	Total Project Budget
	Jesse Goff		\$125,550	\$125,550
Description of Project		Test glycosides of 1,25-dihydroxyvitamin D for anti-cancer activity in vitro and in vivo		
Anticipated End Results		Develop products based on vitamin D to treat and prevent a number of human and animal diseases. The basis for these products is a plant of the Solanaceae family that contains a number of vitamin D-related compounds that have been shown to have unique activities affecting both calcium metabolism and cell growth. An immediate goal is to purify/ synthesize the active compounds for testing in cell culture and in mouse /rat models.		
Results achieved to Date		Initial goals were to synthesize or isolate glycosides of vitamin D. After several attempts to purify the compounds from the plants we concluded that we needed to synthesize the compounds to allow use in tissue culture and animals. This was done and we demonstrated the compounds had about 1 tenth the ability to cause hypercalcemia of the native hormone 1,25-dihydroxyvitamin D. Since this work was done we have focused largely on utilizing these compounds in tissue culture to determine if the compounds can slow the growth of tumor cells in vitro. To date we have shown that we can reduce proliferation (growth rate in tissue culture) of prostate tumor cells (LuCaP line) by 20-30% using our 1,25-dihydroxyvitamin D glucuronide compound. When combined with a different vitamin D metabolite designed to competitively inhibit degradation of the active vitamin D compound we can reduce proliferation of the cells by about 40%. We have tested our 1,25-dihydroxyvitamin D glucuronide in another prostate cell line with only a small (5%) effect on proliferation. But when combined with the competitive inhibitor of degradation we have gotten as much as a 20% reduction in growth of this cell line. We have also tested the compounds in an ovarian cancer cell line with variable results. If the tumor cells are tested while just 20% confluent the vitamin D compounds worked well. If the cells were more than 50% confluent the anti-proliferative effect was less than 10%. We now need to proceed to put these cell lines into "nude" mice that will accept the human tumors and treat them with the compounds. These data will be added to the provisional patent to increase the marketability of the compounds.		
Plans				

Iowa State University	Project	Allocated Dollars FY 2010	Allocated Dollars FY 2009	Total Project Budget
	Michael Olsen	\$55,340	\$104,690	\$104,690
Description of Project	Development of the Next Generation of Vortex Flow Meters for Engine Applications			
Anticipated End Results	To assist J-TEC in developing their next generation of vortex flowmeters, the proposed research seeks to: 1) experimentally study the basic physics of vortex flows generated by struts in automotive applications, 2) develop computational fluid dynamics tools to assist in the design of strut geometries for these applications, and 3) investigate alternative methods for accurate vortex detection			
Results achieved to Date	Since the project began in January, the major accomplishments have been the construction of two wind tunnel facilities in which the experimental study of vortex shedding will take place. The two wind tunnels are meant to mimic the two different types of ducting geometries in which J-TEC's vortex flowmeters are placed, i.e., one of the wind tunnels has a circular cross-section, and the other has a rectangular cross-section. Both wind tunnels are fan driven, and can achieved air flow velocities covering the entire range of vortex flowmeter operation. The last phase of wind tunnel construction is now ongoing, and that involves fitting each of the wind tunnels with a preheating section. In diesel engine operations, the vortex flowmeters measure the flowrates of heated exhaust gases. Because vortex shedding is dependent on air temperature, the preheating sections are necessary to mimic the flow conditions that exist in diesel engine applications. The preheating sections contain electrical heaters that can accurately be controlled to provide a wide range of inlet air flow temperatures. The other accomplishment has been designing the computational grids for the computational fluid dynamics study. With this completed, computer simulations of the flows can now begin.			
Plans	Progress during the first year was hampered by the delay in the investigators receiving GIVF funding due to the catastrophic floods in Cedar Rapids. The research proposal called for three graduate students to begin working on the project in January, but because of delays in funding, only one student was hired to work on the project at that time. This student focused on building the facilities, and thus, that is where the greatest progress has been made. The delay also resulted in approximately \$17,000 in funding for the first fiscal year being unspent and carrying over to the second year. In mid May, two additional graduate students were hired onto the project, and with the project now fully staffed, it is anticipated that the project can progress in a more rapid manner.			
Iowa State University	Project		Allocated Dollars FY 2009	Total Project Budget
	Gary Munkvold		\$25,121	\$25,121
Description of Project	Low-Temperature Plasma Treatments for Improving Seed Performance			
Anticipated End Results	To determine whether low temperature plasma treatment of high value seeds can improve seed performance by reducing contamination from economically important pathogens and/or by enhancing the efficacy of seed treatment fungicides			
Results achieved to Date	Initial testing with low-temperature plasma treatments with varying treatment parameters did not indicate any reductions in fungal contamination. Seed germination was unaffected or, under some treatment parameters, was affected negatively. Initial results on the interactions between low-temperature plasma treatment and fungicidal seed treatment also did not indicate an enhancement of seed treatment efficacy when the plasma treatment was applied. Current testing relates to duration of fungicidal seed treatment efficacy and effect of plasma treatment on this duration. We are working with plasma instrument providers to adjust treatment parameters in an attempt to optimize potential plasma treatment benefits. No commercialization activity has been initiated, and this will not occur until we can establish the value of the low-temperature plasma treatment.			
Plans				
Iowa State University	Project		Allocated Dollars FY 2009	Total Project Budget
	Nicola Pohl		\$66,477	\$66,477
Description of Project	Automated synthesis of custom-order carbohydrates for biologists and pharmaceutical scientists			
Anticipated End Results	To advance carbohydrate synthesis technology developed at ISU to assist LuCella Biosciences, Inc., an Ames startup company, in achieving the success of IDT (Integrated DNA Technologies). The specific goal of the first quarter is to develop larger scale routes to common building blocks necessary to carry out commercial carbohydrate synthesis.			
Results achieved to Date	Work is in progress to scale up the building block syntheses for 30 different building blocks that serve as the basis for the automated synthesis platform. The recent price escalation of certain organic solvents has required some reworking of chemistry; however, initial studies with modified routes continue to look promising. Building block decomposition studies are about to commence. Apart from this grant, our initial web site design is complete and the web site is now online (www.lucellabio.com) with graphic blocks depicting each of the building blocks being made.			
Plans				
Iowa State University	Project		Allocated Dollars FY 2009	Total Project Budget
	Iver Anderson		\$86,592	\$171,499
Description of Project	Iowa Powder Atomization Technologies (IPAT): Titanium Atomizer Prototype Design			
Anticipated End Results	The primary goal of this project is to design and fabricate a novel prototype atomizer for the production of fine spherical titanium metal powder. Upon completion, this prototype will be used to demonstrate the feasibility of an innovative titanium melt pouring concept that can be coupled to a high pressure gas atomization nozzle to produce high quality Ti powder. If successful, commercialization of this atomization technique could result in the start of a new business called Iowa Powder Atomization Technologies (IPAT).			
Results achieved to Date	<p>Task 1: A prototype close-coupled high pressure gas atomization (CC-HPGA) system with a cold wall copper melting crucible and composite refractory superheat pour tube are nearing final stages of design and fabrication. An extended period of detailed system design was conducted and a complete set of engineering drawings was completed. At this time, the atomizer is nearing vacuum capability and is ready to be tested for vacuum integrity. The hanging structure fabrication and assembly for the prototype atomizer is complete. A used cold wall copper crucible has been borrowed from Idaho National Laboratory. This fortunate assistance for our project reduced the lead time for this specialized equipment and was obtained for use for only the expense of shipping. The equipment is now in the possession of the project and will be refurbished before use. The cold wall crucible will be energized by an induction coil using the existing induction powder supply. The coil will be optimized through the use of electro-magnetic field (EMF) modeling at Fluxtrol Inc. of Auburn Hills, MI. They have been contracted to fully design and fabricate the induction coil and EMF shut/concentrator system. This process is currently underway and should ensure successful operation. In addition to the titanium atomizer, a monitoring and recording "module" consisting of extensive temperature and pressure sensors related to the operation of the atomizer is nearing completion. This module will collect and monitor a wealth of system information during operation and will prove to be extremely useful in further testing and optimization. This module also includes a sophisticated system of turbo-molecular vacuum pumps that have been borrowed from Ames Laboratory. This will promote greatly improved vacuum levels prior to atomization to ensure that impurity limits are met during the atomization process.</p> <p>Task 2: The completed prototype CC-HPGA system will be tested for its ability to produce metal injection molding (MIM) quality powder from a Ti alloy. Completion of this task awaits the first trial of the full Ti prototype CC-HPGA system, estimated for March 2010.</p> <p>Task 3: The yield of the prototype CC-HPGA system for high quality titanium alloy powders will be compared to other commercial powders (derived from samples, available data, and informed estimates) in terms of purity and the portion (wt.%) of each batch that is suitable for powder injection molding (dia. <45µm). Several samples of commercial Ti powders have been obtained, as well as chemical analysis data and some information for estimating yield of PIM grade powder for these sources.</p>			
Plans				

Iowa State University	Project	Allocated Dollars FY 2008	Allocated Dollars FY 2009	Total Project Budget
	Tim Ellis	\$23,500	\$33,433	\$33,433
Description of Project	A Novel and Cost-Effective H2S Absorption Technology Using Rubber Particles From Scrap Tires			
Anticipated End Results	Development of a new hydrogen sulfide absorption process to clean biogas using tire derived rubber particles.			
Results achieved to Date	Pilot-scale testing of TDRP for hydrogen sulfide removal at the Ames Water Pollution Control Facility continued from July through December during which runs 16 through 38 commenced. As part of these trial runs, testing conditions included 1.) Temperature, 2.) Gas Contact Time, 3.) Media Compaction, 4.) Alternative Media (for comparison purposes), 5.) TDRP product specificity (Type A versus Type B), and 6.) Siloxane removal efficacy by TDRP. Results showed that hydrogen sulfide removal improved at lower temperatures, though the data were scattered. Longer gas contact time resulted in a higher efficiency of removal, but a lower overall sulfide adsorption capacity. Iron reaction capacity was demonstrated to be much lower than TDRP adsorption capacity when using the same scrubber vessel filled with an equivalent mass of iron pads. Partial media compaction resulted in improved hydrogen sulfide removal without greatly increasing pressure drop across the media bed. TDRP removed siloxanes from biogas with variable but significant efficacy. Laboratory-scale testing was conducted to gain a better understanding of the TDRP treatment mechanism. A strong correlation was found to match metal content and surface area with hydrogen sulfide treatment capability. Particle size analysis and subsequent adsorption testing, however, indicate that TDRP type A removal capacity is not strictly a function of surface area. Detailed analyses of the TDRP surface suggest that TDRP media uses chemical reactions (chemisorptions) to adsorb hydrogen sulfide, which is different than the physical mechanism (physisorption) encountered with activated carbon. Thermographic analysis showed that TDRP was stable at temperatures as high as 250°F, which means that TDRP may be applied to some industrial gas streams.			
Plans				
Iowa State University	Project	Allocated Dollars FY 2010	Allocated Dollars FY 2009	Total Project Budget
	Anil Kelkar	\$9,337	\$134,477	\$143,816
Description of Project	Waste Plastics, Crude Oil Sludge, and Tar Sand to Diesel – Capturing Energy from Waste			
Anticipated End Results	To conduct research related to thermo-catalytic conversion of Waste Hydrocarbons to useful fuels. Specific goal of this GIVF project is to enhance and fine-tune the proof-of-concept technology developed by IIS for converting waste hydrocarbons to high grade fuel by investigating various catalyst and process parameters			
Results achieved to Date	The accomplishment to date on the project are:			
Plans				
Iowa State University	Project	Allocated Dollars FY08 and FY10	Allocated Dollars FY 2009	Total Project Budget
	Victor Lin	\$ 66,000 \$11538	\$105,612	\$117,150
Description of Project	Catalytic Production of 1,6-Hexanediol			
Anticipated End Results	The proposed technology involves conversion of either sorbitol or fructose-derived hydroxymethyl furfural to 1,6-hexanediol (HDO), a chemical precursor to a polymer commonly used by industry. This work represents an opportunity to develop new, lower cost processes that utilize renewable carbohydrate-based feedstocks while lessening reliance on fossil fuels and environmentally hazardous chemicals such as benzene. The proposed reduction is a moderate temperature, catalytic process that has low overall fuel and power demands for the production of HDO relative to traditional routes involving the reduction of adipic acid and its esters.			
Results achieved to Date	Continuing our previous success in synthesizing a rhodium nanoparticle-encapsulated mesoporous silica catalyst (Rh-MS), we have incorporated other metal oxides, such as iron oxide and calcium oxide, into the matrix of this material for superior product selectivity and conversion efficiency. These materials exhibit the same mesoporous structure previously reported. We have demonstrated that these "second-generation" of nanocomposite materials are efficient heterogeneous catalysts for the hydrogenation of both sorbitol and fructose-derived hydroxymethyl furfural. In addition to being a substantial improvement over the conventional catalysts, our catalyst technology enables the use of five-carbon sugars for production of the value-added HDO compound. This technology will be valuable in processing the mixed stream of five-carbon sugars derived from the breakdown of hemicellulose. As noted in our previous report, Grain Processing Corporation, is no longer serving as our industrial partner. The entire R&D budget of GPC has been terminated because of the bad economy. This unfortunate decision of GPC has changed the nature of our partnership in this project. The progress of potential scale-up and commercialization of this technology is consequently affected. We are preparing a research proposal to be submitted to U.S. DOE for further research funding.			
Plans				
Iowa State University	Project		Allocated Dollars FY 2009	Total Project Budget
	David Grewell		\$78,452	\$78,452
Description of Project	Protein Polymer Product Development			
Anticipated End Results	The main thrust of the proposed work is to cooperate with several industrial partners to develop and commercialize novel biobased products that impact Iowa's economy. These products will include hay bale wrapping, pots for plants, dry wall application, construction panels, lubrication sticks and temporary cards.			
Results achieved to Date	Two products are currently being tested by the industrial sponsors; soy protein plastic pellets by SoyWorks and soy based lubrication sticks by Creative Composites. In more detail, we have worked with SoyWorks to develop a soy plastic formulation and pellet geometry to match their product specifications. This involved indentifying proper mixing sequence, material ratio and design, and fabrication of an extrusion die. To date, nearly 500 pounds of soy protein based plastic were supplied to SoyWorks. In addition, we have worked with Creative Composites in developing a soy reinforced lubrication stick that is soy based grease. In more detail, we have worked with Creative Composites to develop a soy oil and flour based formulation stick that had the mechanical strength meeting and exceeding the product based strength requirements. Soy flour was selected as the resin feed stock, in order to assure that costs specifications were not exceeded. Secondly, we developed alternative formulations and mixing procedure to produce a product that met water stability specifications. Lastly, we developed and fabricated a combined friction and wear rate test cell for product testing and performance estimation. Initially the test showed excessive wear rates and low coefficient of friction. Based on these results, the formulations were modified and the current product meets or exceeds the specification of a low wear rate and coefficient of friction besides other product specifications. Recently, Creative Composites tested full sized lubrication sticks based on one of the above mentioned soy oil formulations on rail systems. These tests were reported as "had a positive field test".			

Iowa State University	Project	Allocated Dollars FY 2009	Allocated Dollars FY 2008
	Marian Kohut, Rick Sharp; Principal Investigators	\$8,500	\$84,277
Description of Project	Effectiveness of EpiCor in improving immune function, inflammation, and performance after intense exercise		
Anticipated End Results	Demonstrate that EpiCor decreases recovery time after intense exercise and provides enhanced immunity		
Results achieved to Date	The second phase of the research project has finished data collection involving human subjects. The final assays are being run in the laboratory in December 2009 and January 2010. We anticipate that all data analyses for the second phase will be completed in spring 2010.		
Plans			
Iowa State University	Project	Allocated Dollars FY 2009	Allocated Dollars FY 2008
	Charlie Hurburgh	\$21,000	\$30,450
Description of Project	Automated phenotyping of biomass crops - part I		
Anticipated End Results	Development of a rapid phenotype screening system to increase selection and development of biomass crops.		
Results achieved to Date	No update was provided		
Iowa State University	Project	Allocated Dollars FY 2009	Allocated Dollars FY 2008
	Guru Rao, Principal Investigator	\$15,000	\$55,000
Description of Project	Development of Novel Digestion-Resistant Starches from Corn to Combat Human Disease		
Anticipated End Results	Develop food products with slowly digested starch		
Results achieved to Date	<p>Previous analyses of genetically modified (GM) corn plants identified a line producing long-chain amylopectin starch (LCAPS) that is enzymatically converted to glucose more slowly than normal cornstarch (60% of the normal rate), and another line accumulating a higher than normal percentage of starch (~5% increase, termed HS). Objectives for the current period were: 1) to analyze the properties of a new LCAPS-based starch, LCAPS3, and 2) to design a means to further increase the starch amount in the HS line, toward the long-term goal of producing high yield, slowly digestible starch for incorporation into health-promoting foods.</p> <p>Approach: 1) LCAPS3, produced by breeding the LCAPS line with the genetic mutant line dull1, was further analyzed to evaluate its starch properties. 2) Additional engineering of the maize dull1 gene was accomplished in preparation for further increasing starch in kernels of the HS and LCAPS lines.</p> <p>Accomplishments: 1) Analyses showed that GM LCAPS3 starch has more long chains compared to LCAPS, and is less viscous than normal starch. LCAPS3 also is digested to glucose more slowly than either LCAPS or normal starch; thus, LCAPS3 shows promise as a slow energy release food ingredient. LCAPS3 granules are smaller and smoother than normal starch granules, which may be of interest for certain commercial food applications. 2) Site-directed mutagenesis was employed to alter a specific protein-protein interaction site within the maize dull1 gene. Disruption of this interaction is predicted to ease a "braking mechanism" that normally would limit starch accumulation. Introduction of this newly engineered plasmid into a HS background is predicted to further increase the amount of starch in the kernel. This new line, which could have commercial potential for all cornstarch-based food, feed, and fuel products, will be combined with LCAPS and LCAPS3 traits to produce new healthful HS lines of corn.</p>		
Plans			
Iowa State University	Project	Allocated Dollars FY09	Allocated Dollars FY 2008
	Toni Wang, Principal Investigator	\$6,000	\$71,100
Description of Project	Oil Recovery from corn fermentation by-products		
Anticipated End Results	Obtaining Oil from Corn Ethanol fermentation co-products		
Results achieved to Date	<p>Condensed corn distillers solubles (CCDS) contains more oil than dried distillers grains with solubles (DDGS), 20 vs. 12% (dry weight basis). Therefore, significant amount of oil is present in the liquid fraction after fermentation and ethanol distillation. The oil removed represents a significant alternative feedstock for biodiesel production. The objectives of this second-phase research were to study the effect of enzyme hydrolysis on oil recovery from CCDS, to determine the effect of physical and chemical processes on oil recovery from CCDS, and to characterize quality of oil recovered from CCDS and the nature of deposits in CCDS oil. Employing enzyme processes increased oil recovery. Reducing the particle size of CCDS (by grinding) increased oil recovery, achieving 83% based on acid-hydrolyzed total lipids. For the physical and chemical processes, heating increased oil recoveries, 2.5-fold when temperature was increased from 25 to 59 °C. Oil recovery at acidic pH was significantly greater than at alkaline pHs. Oil extraction using isopropanol and hexane achieved > 80% total oil recovery. Churning CCDS for 3 h at 50 °C and pH 3.5, up to 80% of the oil could be recovered. CCDS oil contains lipids (CCDS oil deposit) that solidify and settle to bottom of tank at ambient temperatures. This deposit had high free fatty acid (36%), high palmitic acid and wax contents causing a semi-solid appearance at ambient temperatures. These should be removed before making biodiesel.</p>		
Plans			
Iowa State University	Project	Allocated Dollars FY09	Allocated Dollars FY 2008
	Mike Wammesheiler, Principal Investigator	\$30,000	\$121,966
Description of Project	Generation X vaccines: combining novel antigens and single dose delivery technologies		
Anticipated End Results			
Results achieved to Date	<p>The goals of this project are to develop a novel vaccination strategy using bioerodible poly(hydroxy) acid nanospheres and modification of the vaccine candidate with the sugar alpha-galactose (αGal). This will lead to the design of a vaccine regimen that will induce protective immunity following immunization with a single dose and improve patient compliance. The project focuses on the use of a recombinant protein (rF1-V) derived from Yersinia pestis, the causative agent of plague. During the past six months, we have focused on the induction of anti-F1-V antibodies following immunization with αGal-modified rF1-V loaded into poly(hydroxy) acid nanospheres. The amount of immunogen delivered at the initiation of the immune response is important to induce robust immune responses. In vitro studies showed that significantly more αGal-modified rF1-V was released from nanoparticles during the first 5 days than unmodified rF1-V suggesting that higher antibodies titers would be induced by immunizing mice with nanoparticles loaded with αGal-modified rF1-V than unmodified rF1-V. In addition, these studies demonstrated that loading rF1-V into the CPTEG:CPH copolymer facilitated the stability of the protein. As in vitro release studies predicted, delivery of αGal-modified rF1-V via nanoparticles induced higher antibody responses than nanoparticle delivery of unmodified rF1-V. In addition to the higher antibody responses, mice vaccinated with nanoparticles containing αGal-modified rF1-V responded with significantly higher lymphocyte recall responses. In addition to using αGal-modification of the protein, we have begun to evaluate carbohydrate modification of the nanoparticles themselves. Preliminary studies indicate that antigen-presenting cells more readily take-up the modified particles than unmodified particles suggesting another mechanism by which carbohydrate modifications may be used to enhance the immune response.</p>		
Plans			

Iowa State University - as of December 31, 2009
 Grow Iowa Values Fund Appropriations

FY 2010 GIVF Appropriation \$750,000 Board of Regents approved August 2009
 \$982,500

Iowa State University	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009
1	Commercialization Infrastructure and Campus-Wide Entrepreneurial Culture	FY 2010 State Appropriations (GIVF)	\$600,000	\$197,541
		FY 2010 Matching Funds (General Fund)		\$344,723
		FY 2010 Matching Funds (In-Kind)		
		FY 2010 Matching Funds (Other)		
	Description of Project	See individual projects		
	Anticipated End Results			
	Results achieved to Date			
	Plans			
Iowa State University	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009
2	Commercialization Program	FY 2010 State Appropriations (GIVF)	\$1,132,500	\$112,716
		FY 2010 Matching Funds (General Fund)		\$20,503
		FY 2010 Matching Funds (Federal Support)		
		FY 2010 Matching Funds (Cash)		\$11,218
		FY 2010 Matching Funds (In-Kind)		
	Description of Project	See individual projects		
	Anticipated End Results			
	Results achieved to Date			
	Plans			
Iowa State University	Project		Allocated Dollars FY 2010	Total Project Budget
	Isse Goff		\$89,657	\$89,657
	Description of Project	Test impact of plant-derived Vitamin D		
	Anticipated End Results	Develop products based on vitamin D to treat and prevent a number of human and animal diseases. The basis for these products is a plant of the Solanaceae family that contains a number of vitamin D-related compounds that have been shown to have unique activities affecting both calcium metabolism and cell growth and immune function. The native hormone form of vitamin D has been shown to ameliorate the symptoms or slow development of several auto-immune disorders in mice. However, the hypercalcemic effect of the native hormone precludes its use in humans. We intend to utilize glycosides of vitamin D compounds to target delivery of the vitamin D compounds to the lower gut to ameliorate inflammatory bowel disease. By delivering the vitamin D compounds only to the affected tissues we can reduce the potential for toxicity allowing use in humans.		
Iowa State University		In immune cells, 1,25-dihydroxyvitamin D generally has an anti-proliferative effect and down-regulates production of Th1 cell inflammatory cytokines. Studies in mice also demonstrate 1,25-dihydroxyvitamin D acts within intestinal lining cells and is essential in maintaining the integrity of the intestinal mucosal barrier. In mouse models of induced IBD treatment with large doses of the hormone, 1,25-dihydroxyvitamin D can reduce the symptoms and lesions of IBD in these models, but these doses cause life threatening hypercalcemia. At the onset of this study we had determined that oral administration of our vitamin D glycosides resulted in release of the vitamin D compounds in their active form only in the lower intestine. This allows us to target delivery of these compounds to the lower intestine in amounts that would otherwise prove toxic. We have utilized a mouse model of inflammatory bowel disease to see if we can deliver a therapeutic dose of the vitamin D compounds to the lower gut. In the study we have completed our 1,25-vitamin D glucuronide alone noticeably reduced severity of disease when fed at 70 ng /day. An equivalent amount of 1,25-dihydroxyvitamin D had a similar effect but caused severe hypercalcemia. When we combined our 1,25-dihydroxyvitamin D glucuronide with our vitamin D compound developed to competitively inhibit degradation of the 1,25-dihydroxyvitamin D inside target cells we got a highly significant reduction in clinical inflammatory bowel disease, with a moderate but tolerable increase in blood calcium. These data have been incorporated into the provisional patent application and are being readied for publication. Various combinations of compounds need to be tested to optimize the treatment as well as development of alternative models of inflammatory bowel diseases. Demonstrating therapeutic effect in several models will improve the likelihood that this will be chosen for use in human Phase I clinical trials.		
	Plans			
Iowa State University	Project		Allocated Dollars FY 2010	Total Project Budget
	Brad Bosworth		\$146,610	\$146,610
	Description of Project	Development, evaluation and commercialization of vaccines for swine influenza virus		
	Anticipated End Results	The goal of this project is to develop replicons that express various influenza HA genes and to determine their immunogenicity and efficacy as SIV vaccine candidates		
	Results achieved to Date	Replicons expressing the hemagglutinin (HA) gene of novel H1N1 (A/California/04/2009), swine H1 Beta, Gamma, and Delta have been produced (the Delta HA gene has been included as it is a recently identified H1 cluster). Replicon subunit (RS) vaccines consisting of individual antigens (Beta, Gamma, and Delta HA protein) were evaluated for an antibody response in a pig study. Each vaccinated group developed a positive homologous hemagglutination inhibition (HI) titer at varying dilutions of vaccine antigen. Since its introduction, novel H1N1 virus has been a concern for swine producers, thus our first efficacy study evaluated the novel H1N1 vaccines. Pigs were vaccinated within two months of the novel H1N1 outbreak being reported in the human population. After challenge with virulent A/California/04/2009, both replicon particle (RP) and RS vaccinated pigs demonstrated reduced viral shedding and lung pathology, and increased average daily and HI titers, when compared to non-vaccinated pigs. These studies demonstrate that the replicon technology allows for more rapid development of vaccine than with traditional methods, and that these vaccines are immunogenic and efficacious. Sirrah Bios has already begun selling the SIV (swine influenza virus) RS vaccine, including the novel H1N1 vaccine. The quick sales of this vaccine can be attributed to the VCP (Veterinarian/Client/Patient) relationship, the ease of large scale production using this technology, and the ability to offer these HA antigens in a customizable combination vaccine. Recently, Sirrah Bios has been selling an estimated 40,000 doses of SIV RS vaccine per month. In addition, Harrisvaccines, Inc. d/b/a Sirrah Bios, has submitted an application to the Center for Veterinary Biologics (CVB) for conditional licensure of the novel H1N1 RS vaccine.		
	Plans			

Iowa State University	Project	Allocated Dollars FY 2010	Total Project Budget
	Bryony Bonning	\$107,680	\$107,680
Description of Project	Transgenic Plant Resistance to Invertebrate Pests		
Anticipated End Results			
Results achieved to Date	Dr. Narinder Pal was hired as an Assistant Scientist II and began work on this project on November 13th, 2009. In the past month, she has made good progress on the initial preparation of constructs for production of recombinant fusions proteins to test in bioassays against various invertebrate pests.		
Plans			
Iowa State University	Project	Allocated Dollars FY 2010	Total Project Budget
	Pat Halbur	\$69,500	\$69,500
Description of Project	Development of novel genetic test for cattle diseases		
Anticipated End Results	Develop and commercialize a panel of molecular diagnostic assays for detection of genetic diseases and production traits sensitive enough to use on biopsies from bovine embryos. This will benefit the Iowa beef and dairy industries by decreasing costs associated with maintaining the pregnancies of genetically diseased animals and accelerating the selection of genetically superior seed stock Iowa cattle producers.		
Results achieved to Date	Primer and oligonucleotide designs needed for assay development of the highest priority trait (gender determination of embryos) and genetic diseases (Complex Vertebral Malformation, Bovine Leukocyte Adhesion Deficiency) are complete. Bovine samples have been obtained for validation of the gender determination and Bovine Leukocyte Adhesion Disease tests. All reagents have been ordered and initial screening has begun for sexing to identify the primer/probe sets to be used in the final kit design. Intellectual property issues associated with obtaining and use of information for developing tests for Arthrogyposis Multiplex (AM-Curley Calf Syndrome) and Neuroptic Hydrocephalus (NH) are in progress. The group is also gathering information on developing tests for a recently identified disease known as Fawn Calf Syndrome (FCS) and assessing the need for including this in the high priority panel of tests. The project is on target to achieve the goal of having commercial kits available for use to detect a panel of 3-5 bovine genetic diseases and production traits accessible through the Iowa State University Veterinary Diagnostic Laboratory by the end of 2010.		
Plans			
Iowa State University	Project	Allocated Dollars FY 2010	Total Project Budget
	David Grewell	\$34,504	\$34,504
Description of Project	Demonstration and scale-up of the use of high-powered ultrasonics to gelatinize corn starch		
Anticipated End Results	The main thrust of the proposed work is to cooperate with several industrial partners to develop and commercialize novel bio-based products that impact Iowa's economy. These products will include hay bale wrapping, pots for plants, dry wall application, construction panels, lubrication sticks and temporary cards.		
Results achieved to Date	Two products are currently being tested by the industrial sponsors; soy protein plastic pellets by SoyWorks and soy based lubrication sticks by Creative Composites. In more detail, we have worked with SoyWorks to develop a soy plastic formulation and pellet geometry to match their product specifications. This involved indentifying proper mixing sequence, material ratio and design, and fabrication of an extrusion die. To date, nearly 500 pounds of soy protein based plastic were supplied to SoyWorks. In addition, we have worked with Creative Composites in developing a soy reinforced lubrication stick that is soy based grease. In more detail, we have worked with Creative Composites to develop a soy oil and flour based formulation stick that had the mechanical strength meeting and exceeding the product based strength requirements. Soy flour was selected as the resin feed stock, in order to assure that costs specifications were not exceeded. Secondly, we developed alternative formulations and mixing procedure to produce a product that met water stability specifications. Lastly, we developed and fabricated a combined friction and wear rate test cell for product testing and performance estimation. Initially the test showed excessive wear rates and low coefficient of friction. Based on these results, the formulations were modified and the current product meets or exceeds the specification of a low wear rate and coefficient of friction besides other product specifications. Recently, Creative Composites tested full sized lubrication sticks based on one of the above mentioned soy oil formulations on rail systems. These tests were reported as "had a positive field test".		
Iowa State University	Project	Allocated Dollars FY 2010	Total Project Budget
	Byron Brehm-Stecher	\$106,690	\$106,690
Description of Project	Develop detection systems to test for pathogens at the farm, food processing, and clinical levels		
Anticipated End Results			
Results achieved to Date	<ul style="list-style-type: none"> • Highlights of our progress include: <ul style="list-style-type: none"> • Hired Dr. Hyun Jung Kim from the University of Rochester Medical School, New York. Dr. Kim is a published expert on the use of the polymerase chain reaction (PCR) for the rapid detection of foodborne pathogens. Dr. Kim will begin work in the lab on January 4th, 2010. • Purchased a small rapid thermal cycler (PIKO thermocycler, Finnzymes, Inc.) for speeding up the polymerase chain reaction (PCR) component of the sample-to-DNA profile section of our pathogen detection workflow. • Evaluated several commercially available enzyme systems (Kappa 2G, Phusion, KOD hot start) for their suitability for their rapid-cycling PCR protocols. • Reduced time required to generate PCR products in Salmonella-specific and methicillin-resistant Staphylococcus aureus (MRSA)-specific reactions from ~2.5 hours to ~26 minutes - an almost 6-fold improvement - using the PIKO rapid cycling instrument. • Applied for and received external funding (\$30,469) from the Midwest Dairy Association (MDA) for development of pre-analytical sample preparation procedures that are expected to be of direct benefit to our work with the DNAProfiler. 		
Plans			
Iowa State University	Project	Allocated Dollars FY 2010	Total Project Budget
	Anumatha Kanthasamy	\$128,100	\$128,100
Description of Project	Test novel protein kinase compounds for efficacy in treating Parkinson's Disease		
Anticipated End Results	Our main goal is to develop oral neuroprotective drugs for the treatment of Parkinson's disease (PD) in humans. Currently we are in the preclinical stage of drug development. The ultimate success of the proposed neuroprotective technology may create many new opportunities in Iowa, including economic and job growth and a viable biotechnology industry.		
Results achieved to Date	<p>In our proposal, we proposed that we would characterize PK8202 and PK9301 in animal models but later we discovered that PK9302 compound was more efficacious in cell culture experiments, therefore we decided to use PK8202 and PK9302 in all our studies.</p> <p>Prior to evaluation in animal models, we determined the inhibitory potency of lead analogs PK8202 and PK9302 in in vitro PKCα kinase assays. The IC50 of lead PK analogs were 1-13-fold more potent than parent compound rottlerin. Kinase profiling against a panel of 15 closely related protein kinase targets revealed that the lead PK analogs did not show any notable off-target effects. In addition lead PK analogs rescued primary neurons against MPP1-induced TH neuronal loss.</p> <p>As a proof of concept, we began animal studies by testing a single dose of PK8202 and PK9302 in MPTP induced animal model of PD. MPTP-induced behavioral deficits and neuronal dopamine loss were used markers. The preliminary studies revealed that co-treatment with lead PK analogs, PK8202 and PK9302 significantly improved horizontal and vertical locomotor deficits and attenuated striatal dopamine and DOPAC loss in MPTP-treated animals.</p> <p>Encouraging preliminary data now allows us to perform detailed efficacy studies using multiple doses of analogs in animal models of PD as described in our proposal. These include examining the neuroprotective effect of PK analogs against MPTP-induced behavioral, neurochemical, biochemical and histological changes. These will be determined by measuring motor deficits, dopamine levels, caspase-3 activation, PKCα activation, DNA fragmentation, and TH positive dopaminergic cell loss.</p> <p>Funding has helped a hire a full-time post-doctoral researcher for carrying out animal studies and a graduate student for synthesis of PK analogs.</p> <p>A license option has been negotiated between ISU Research Foundation and PK Biosciences and will go into effect first week of January, 2010. PK Biosciences has successfully formed a scientific and business advisory board which will assist by reviewing and advising on primary development decisions as the company moves forward</p>		

Des Moines University	Award \$	78,000.00	Budgeted Match \$	141,395.00	Project Budget \$	219,395.00
Total GIVF Reimbursements Approved: \$		78,000.00	Reported Match: \$	121,026.48	Project Total \$	199,026.48

Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved
05/31/07	\$19,700.00	\$19,700.00	06/04/07
10/10/07	\$8,059.42	\$8,059.42	10/15/07
01/28/08	\$11,380.62	\$11,380.62	01/28/08
04/21/08	\$11,250.13	\$11,250.13	04/21/08
08/12/08	\$27,609.83	\$27,609.83	08/12/08

Date Reported	Match Amount	Reporting Period	Total Reported
6/30/2007	\$16,771.97		\$36,471.97
6/30/2008	\$86,131.98		\$94,191.40
12/31/2008	\$18,122.53		\$29,503.15
			\$11,250.13
			\$27,609.83
Total Reported			\$ 199,026.48

Des Moines University seeks \$78,000 to conduct research designed to provide new methods for identifying mutations in the genetic material of pregnant women that increase their risk of delivering infants prematurely and to seek a commercial opportunity for disseminating the work. The research will begin with DNA test screening of pregnant women to provide the information necessary to create a test panel for specific mutations that can be combined into a single test for screening pregnancies. The Principal Investigators (PIs) state this detection method can then be developed as a rapid one-step commercial service or product. The PIs state they will conduct a rigorous feasibility study to determine the market potential for a prematurity test panel and take initial steps to develop a plan for commercialization. The PIs estimate there are annually 60,000 cases of prematurity in the United States and that the market for a prematurity screening product may be ten times that number. The project budget submitted identifies \$105,989 in direct and indirect cost share for the first year of the project.

Drake University	Award	\$ 67,000.00	Budgeted Match	\$ 516,019.00	Project Budget	\$ 583,019.00
Total GIVF Reimbursements Approved:		\$66,505.48	Reported Match:	\$26,098.16	Project Total	\$92,603.64

Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved	Date Reported	Match Amount	Reporting Period	Total Reported
04/19/07	\$2,789.15	\$2,789.15	05/10/07	2/15/2008	\$11,732.93		\$14,522.08
07/12/07	\$12,189.79	\$12,189.79	07/12/07		\$14,365.23		\$26,555.02
10/16/07	\$32,329.73	\$32,329.73	10/17/07				\$32,329.73
01/16/08	\$1,142.50	\$1,142.50	01/16/08				\$1,142.50
07/15/08	\$2,361.20	\$2,361.20	07/28/09				\$2,361.20
08/12/08	\$4,298.11	\$4,298.11	08/12/08				\$4,298.11
04/18/09	\$11,395.00	\$11,395.00	04/18/09				\$11,395.00
						Total Reported	\$ 81,208.64

Drake University (DU) seeks \$67,000 to enhance technology and product commercialization through DU's College of Pharmacy and Health Sciences DELTA Rx Institute and the Drake Undergraduate Science Collaboration Institute (DUSCI). The proposal would fund programs designed to develop entrepreneurial skills through entrepreneurial workshops to educate and assist faculty and students seeking commercialization of a product or idea. The project will also provide funding for participation by students in a pharmaceutical compounding boot camp where they will learn how to develop new formulas and how to find markets for commercialization to hospitals and pharmacies in Iowa. Students will work with mentors to prepare business plans for submission to the Pappajohn Center business plan competition at Drake University. The DELTA Rx Institute is also in development of a "product concept competition" that will provide a further venue for commercialization. The project budget submitted identifies \$516,019 in direct and indirect cost share.

Drake University	Award	\$ 71,207.00	Budgeted Match	\$ 71,207.00	Project Budget	\$ 142,414.00	
Total GIVF Reimbursements Approved:	\$	91,633.33	Reported Match:	\$	93,651.00	Project Total	\$185,284.33

Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved
04/14/09	\$854.75	\$854.75	04/14/09
10/20/08	\$18,598.38	\$18,598.38	10/24/08
03/13/09	\$895.50	\$895.50	03/13/09
07/30/09	\$30,737.83	\$30,737.83	07/30/09

Date Reported	Match Amount	Reporting Period	Total Reported
			\$854.75
			\$18,598.38
			\$895.50
			\$30,737.83
Total Reported			\$ 31,633.33

Drake University seeks \$71,207 to enhance technology and product commercialization through DU's College of Pharmacy and Health Sciences DELTA Rx Institute and the Drake Undergraduate Science Collaboration Institute (DUSCI). This represents a second year of GIVF funding for this project. The goal of the project is to bring students, practitioners and research faculty together to develop the practices and skills for successful development of innovative pharmaceutical practices and products. The proposal would fund programs designed to develop entrepreneurial skills through entrepreneurial workshops to educate and assist faculty and students seeking commercialization of a product or idea. The project will also provide funding for participation by students in a pharmaceutical compounding boot camp where they will learn how to develop new formulas and how to find markets for commercialization to hospitals and pharmacies in Iowa. Students will work with mentors to prepare business plans for submission to the Pappajohn Center business plan competition at Drake University. The DELTA Rx Institute is also in development of a "product concept competition" that will provide a further venue for commercialization. The project budget identifies \$71,607 in matching cost share.

Drake University	Award	\$ 60,000.00	Budgeted Match	\$ 93,651.00	Project Budget	\$ 153,651.00	
Total GIVF Reimbursements Approved:		\$ -	Reported Match:		\$ -	Project Total	\$0.00

Expenses Submitted

Match Funds Reported

Date Submitted Amount Requested Amount Approved Date Approved

Date Reported Match Amount

Reporting Period	Total Reported
	\$0.00
	\$0.00
	\$0.00
	\$0.00
Total Reported	\$ -

Drake University seeks funding to assist in the establishment of Pharmacogenomics Training and Research Laboratory (PRTL). Pharmacogenomics is a discipline of health science related to the manner in which genes affect individual response to drugs. Pharmacogenomics has begun to offer tools for using individual genetic variations and drug responses to personalize or customize treatment or therapy in diseases such as breast cancer and leukemia. The proposal indicates the PRTL facility will serve as a central facility for Drake faculty involved in research requiring access to molecular, genomic and bioinformatics technologies. It is also proposed the facility would be available on a fee basis for individuals and organizations outside the university engaged in health care research. The facility will also be used for training current and future Drake students and to Iowa physicians, pharmacists and nurses involved in the use of the technology. The proposal indicates a positive commercial impact of the facility will result from: The largest single component of the proposal is for purchase of a pyrosequencer for automatic DNA sequencing and genotyping. The project budget identifies \$153,651 in matching funds from private donors and Drake University. The proposal indicates the project leader, Dr. Pramod Mahajan, previously served as managing director at the University of Texas Medical Branch Molecular Biology Center and is the lead inventor or author of 30 issued U.S. patents.

University of Dubuque	Award \$	200,000.00	Budgeted Match \$	219,000.00	Project Budget	\$ 419,000.00
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Total GIVF Reimbursements Approved:	\$ 200,000.00	Reported Match:	\$ 200,000.00	Project Total	\$ 400,000.00
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Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved
06/27/06	\$ 140,466.00	\$ 140,466.00	07/01/06
05/04/07	\$ 63,448.24	\$ 59,534.00	05/10/07

Date Reported	Match Amount
3/23/2007	\$ 140,466.00
1/16/2008	\$59,534.00

Reporting Period	Total Reported
	\$ 280,932.00
	\$ 119,068.00
Total Reported	\$ 400,000.00

The University of Dubuque requests \$200,000 from the GIVF to provide equipment and support for research. Equipment to be purchased includes a fermentor, specimen freezer, stereo microscope, and a user-license for molecular-modeling software.

The proposal describes the proposed research as a commercialization opportunity. The funded research would be undertaken to establish whether or not a particular enzyme is involved in the uptake of iron by certain organisms. If such a relationship exists, still further research would be conducted to determine whether the enzyme can be used as a vaccine. The proposal does not identify the medical or commercial applications for such a vaccine. The proposal does not indicate whether the idea has been systematically evaluated for its commercial value.

According to the proposal, the project would create a job for a post-doctoral researcher and provide a summer stipend for a student research technician. The complete proposal includes information on matching funds sources and an outline of metrics to evaluate results.

Luther	Award \$	55,000.00	Budgeted Match \$	134,607.00	Project Budget	\$	189,607.00
Total GIVF Reimbursements Approved:		\$54,751.68	Reported Match:	\$133,607.00	Project Total	\$	188,358.68

Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved	Date Reported	Match Amount	Reporting Period	Total Reported
11/05/07	\$16,662.66	\$16,662.66	11/09/07	11/30/2009	\$133,607.00		\$150,269.66
01/11/08	\$811.92	\$811.92	01/11/08				\$811.92
04/14/08	\$197.84	\$197.84	06/19/08				\$197.84
06/30/08	\$37,079.26	\$37,079.26	06/30/08				\$37,079.26
						Total Reported	\$ 188,358.68

Luther College seeks \$55,000 for a project to develop novel polymerization catalysts that will strengthen the viability of biodegradable polymers produced from Iowa crops. The annual production of polylactide (PLA) from renewable sources such as corn is currently estimated at 150 million pounds, with a number of uses in fiber, film and packaging materials. PLA from biodegradable sources is currently produced by companies such as Cargill, which have a significant grain processing presence in Iowa. However, the product cannot be used in some applications because current production methods result in a product with lesser thermal or tensile strength compared to petroleum-based products like polyethylene or polypropylene. The PIs propose to investigate the use of titanium-based catalysts in the production of PLA from biodegradable sources which may improve the thermal and tensile performance of the product. The PIs will evaluate the commercial potential of the technology and will pursue patent protection and commercialization opportunities. The project budget identifies a total of \$134,607 in direct and indirect cost share.

\$134,607 in direct	Award \$	32,337.00	Budgeted Match \$	32,405.00	Project Budget	\$	64,742.00
h:\economic	Disbursements Approved:	\$32,327.50	Reported Match:	\$32,405.00	Project Total	\$	64,732.50

Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved	Date Reported	Match Amount	Reporting Period	Total Reported
08/06/08	\$11,895.79	\$11,895.79	08/06/08	08/06/08	\$32,405.00		\$44,300.79
01/22/09	\$13,599.00	\$13,599.00	01/22/09				\$13,599.00
07/20/09	\$6,832.71	\$6,832.71	07/20/09				\$6,832.71
						Total Reported	\$ 64,732.50

Luther College seeks \$32,337 for a project to document DNA content variation in Iowa prairie plants. The project will provide basic data to allow researchers to develop the most productive and efficient plantings to provide sustainable sources of biomass for alternative fuel production. The same database will be used by researchers and seed producers interested in prairie restoration projects and in efforts to minimize and eradicate invasive species of plants. An Iowa company, Ion Exchange, Inc. will partner with the researchers to provide a source of seeds and plants for the project. Project leaders indicate more than 20 Iowa companies currently supply native seeds and plants in the state. The project budget identifies a total of \$32,405 in matching cost share.

Luther	Award \$	100,000.00	Budgeted Match \$	100,505.00	Project Budget	\$	200,505.00
Total GIVF Reimbursements Approved:		\$69,420.44	Reported Match: \$	88,873.00	Project Total	\$	158,293.44

Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved	Date Reported	Match Amount	Reporting Period	Total Reported
07/29/09	\$39,782.23	\$39,782.23	07/29/09	11/30/09	\$88,873.00		\$128,655.23
07/29/09	\$6,832.71	\$6,832.71	07/29/09				\$6,832.71
11/05/09	\$22,805.50	\$22,805.50	11/05/09				\$22,805.50
						Total Reported	\$ 158,293.44

Luther College seeks funding for a project entitled “A New Class of Plant-Based Plastics Derived from Soybean and Corn Oil.” Specifically, the researcher proposes to develop polyguanidine polymers from the fatty acids found in soybean and corn oil. The principal investigator believes these specific polymers, being entirely plant-based, offer advantages compared to other bioplastics derived from soybean or corn oil which still contain petrochemical based components. It is also believed the polyguanidine polymers have a more stable molecular structure which will make them well suited for particular applications like liquid crystal displays.

The project budget identifies \$100,505 in matching funds. The principal investigator has previously received GIVF funding through the Board of Regents for development of chemical catalysts and already holds one patent in corn-based plastics technology.

Clarke	Award \$	97,164.00	Budgeted Match \$	114,928.00	Project Budget \$	212,092.00
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Total GIVF Reimbursements Approved:	\$32,737.20	Reported Match: \$	47,870.00	Project Total	\$	80,607.20
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Expenses Submitted

Match Funds Reported

Date Submitted	Amount Requested	Amount Approved	Date Approved	Date Reported	Match Amount	Reporting Period	Total Reported
08/12/08	\$32,737.20	\$32,737.20	08/12/08	6/30/2008	\$26,060.00		\$58,797.20
				12/31/2008	\$15,600.00		\$15,600.00
				12/31/2009	\$6,210.00		\$6,210.00
						Total Reported	\$ 80,607.20

Clarke College seeks \$97,337 for a project to develop a web-based HIV analysis library and a software product to be made available through licensing agreements. The library and software product will enable researchers to more efficiently mine HIV databases and develop statistical analyses which are necessary for providing better treatment options. The proposal is a result of collaborative efforts involving Clarke College, the University of Iowa, the University of Wisconsin-Madison and the University of Stanford. The cooperating institutions have existing HIV data sets and/or have medical and software expertise in related areas. Clarke College will host the proposed database and provide a secure network. In addition to the software product, Clarke anticipates being able to market related consultation services. The proposal identifies \$114,928 in matching cost share.

- 1 Phase I: ISTART - Iowa Startup and Entrepreneurship Fund
- 2 Phase I: IGROW - Iowa Growth and Development Fund

FY 2009 GIVE Appropriation **\$1,925,000** Board of Regents approved August 2008
 \$1,520,000 **(\$389,283)** Budget Reduction
 \$0 **\$1,535,717** Adjusted FY 2009 Budget

University of Iowa	Project	List of all FY 2009 Revenue Sources		Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
1	Phase I: ISTART - Iowa Startup and Entrepreneurship Fund	FY 2009 State Appropriations (GIVF)		\$1,520,000	\$1,198,688
		FY 2009 Matching Funds (Other)		\$1,520,000	\$1,221,406
Description of Project	The I-START program is targeted at facilitating university-private sector partnerships in entrepreneurship and the creation of new companies and jobs in Iowa. Individual projects were developed that support commercialization projects based on the University's or partner's intellectual property, and to provide support for the economic development infrastructure				
Anticipated End Results	Accelerate commercialization of UI intellectual property through company formation by providing support through "proof of concept" funding. CEO and EIR in-residence programs, JPEC and ICE programs, and new life sciences business incubator, etc.				
Results achieved to Date/Plans	<p>Results include:</p> <ul style="list-style-type: none"> • Increased collaboration with IDED in support of IDED programs in recruitment of companies to Iowa and support of new company formation in Iowa. Examples include IDED GIVF funds (\$1M) awarded to the UI in support of its collaboration with Exemplar Genetics to develop porcine models of human disease as a business enterprise, and assistance provided by UI to Terpenoid Therapeutics in obtaining IDED Demonstration funds. • Design and construction of new SUI life sciences incubator is completed. The facility contains 20 laboratories and 16 offices for life science start-up companies. <p>FY 2009 FUNDS</p> <ul style="list-style-type: none"> • GIVF Seed Grant Program using FY09 funds was announced with a total budget of \$300K. The funds are to support the development of innovations with commercial potential, with the result that more UI technology reaches the marketplace as the foundation for new Iowa companies and/or the growth of existing Iowa companies. The funding is intended to support a wide-range of stages in technology development, from initial concept (prior to intellectual property disclosure), to proof of concept, to licensing and commercialization. A call from proposals is located at http://research.uiowa.edu/ifi/index.php?get=givfseedgrantguidelines. There were 20 proposals submitted from this call. • With the assistance of Entrepreneur in Residences, reviewed more than 200 technologies for top business development candidates. UIRF vetted 16 company concepts and identified top company candidates (6 emerged). • Operational support for John Pappajohn Entrepreneurial Center to provide direct entrepreneurial services to faculty, staff, students and community members. A highlight of JPEC accomplishments - 1) 59 people participated in FastTrac® Entrepreneurial Training programs in Iowa City resulting in an estimated 10 business start-ups and 88 jobs created; 2) 14 applications processed for Wellmark VC Funds resulting in 3 companies funded; 3) 51 student teams enrolled in Bedell Learning Lab since 2004 (27 in FY09) resulting in 11 new business start-ups; and 4) Elevator pitches competitive completed. • Funding to pay off loan for SUI life sciences incubator - Six companies (Vertex, Cellular Engineering Technologies, Terpenoid Therapeutics, ASL Analytical, KemPharm and Exemplar Genetics) occupy 9 wet labs and 9 dry labs/offices in BVC. Three of these received GIVF or Battelle funding over the past 4 years. • Start Up funds for Dr. Mani Subramanian (faculty entrepreneur director at CBB). CBB accomplishments included 1) \$2.78M in revenues in FY09; 2) CBB supported work of other GIVF/Battelle projects: Weiss lab, Ophtherion, ASL Analytical, O'Doriso lab; and 3) CBB served 35 clients in FY09, including 4 in Iowa and 2 from the UI. • SBDC served 233 clients, assisted 29 business start-ups, and assisted clients in obtaining \$2.3M in SBA loans. • Operational funds for BioVentures Center including new marketing plans and new interactive website launched for SUI Research Park and staff support. • Seed funding for an ISU and SUI collaboration to develop novel vaccines and therapies for veterinary and human infectious diseases. Year 1 - deliverables were focused on developing a viable material that meets structural and biologic criteria to be used to fill cartilage matrix cracking. Year 2 - testing was carried out mainly at the UI in a series of in vitro tests using bovine osteochondral specimens. 				
2	Phase I: IGROW - Iowa Growth and Development Fund	FY 2009 State Appropriations (GIVF)		\$0	\$0
		FY 2009 Matching Funds (Other)		\$0	\$0
Description of Project	The IGROW program is designed to address middle to long-term commitments needed to strengthen the University's capacity to promote and sustain high tech entrepreneurship and to promote research and technology-driven economic development in Iowa. These funds will also be used to meet USDA standards necessary to produce supplies of drug materials used in human clinical trials.				
Anticipated End Results	The University directs funds to promote high-tech entrepreneurship and build new networks among people with technical, financial, and business expertise and sustain the growth of industries that provide high-paying jobs for the citizens of Iowa. For example, fund dollars would help to recruit entrepreneurial faculty who plan to operate new companies in Iowa.				
Results achieved to Date/Plans	FY 2009 : IGROW was reduced to zero due to the GIVF budget reduction in Fall 2008.				

	<u>FY 2010 GIVF Appropriation</u>	\$1,732,500 Board of Regents approved August 2009
1	Support new company formation through University of Iowa Research Foundation	\$450,000
2	Support operational and personnel costs of key economic development areas	\$357,000
3	Fund expenses at the new BioVentures Building	\$300,000
4	Support of the Office of Vice President of Research	\$194,000
5	Support training, consultation and outreach for Iowa entrepreneurs	\$190,000
6	Expand the Center for Biocatalysis & Bioprocessing into a state-of-the-art Bioprocessing Center	\$241,500
		\$1,732,500

University of Iowa	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009			
	Support new company formation through University of Iowa Research Foundation	FY 2010 State Appropriations (GIVF)	\$450,000	\$0			
		FY 2010 Matching Funds (Other)	\$450,000	\$0			
Description of Project	The University of Iowa Research Foundation (UIRF) will focus on two primary activities. First, continue with its contribution to the integrated model of new company formation. Second, educate faculty in key colleges and departments towards identifying viable technology that has potential to create intellectual property that can be protected and lead to new companies and/or licensing opportunities.						
Anticipated End Results	As these programs are implemented and sustained, we expect the pipeline of promising new ventures to become a robust source of on-going economic development in Iowa. New company formation based on UI or Iowa-related intellectual property involves assessment and exploration, early planning and development, and pre-seed and seed investing.						
Results achieved to Date/Plans	1) Funds will be utilized to support existing projects that continue to demonstrate commercial merit. This support will include specialized entrepreneurs-in-residence, technology experts, external grant identification and application, intellectual property evaluation and strategy, external partnership development, and assistance in securing investment. 2) GIVF Seed Grant Program using FY10 funds will be announced in June 2010. The funds are to support the development of innovations with commercial potential, with the result that more UI technology reaches the marketplace as the foundation for new Iowa companies and/or the growth of existing Iowa companies. The funding is intended to support a wide-range of stages in technology development, from initial concept (prior to intellectual property disclosure), to proof of concept, to licensing and commercialization.						

University of Iowa	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009			
	Support operational and personnel costs of key economic development areas	FY 2010 State Appropriations (GIVF)	\$357,000	\$168,538			
		FY 2010 Matching Funds (Other)	\$357,000	\$168,538			
Description of Project	These funds will support critical economic development support functions associated with University Research Park, BioVentures Center, Technology Innovation Center and IOWA Centers for Enterprise.						
Anticipated End Results	Staff support to provide unique facilities and incubate technology based companies as well as facilitate linkage with key university core resources						
Results achieved to Date/Plans	1) Satellite offices for all IOWA Centers for Enterprise units have been established at BioVentures Centers. This will provide tenant companies direct access to experts to help move their business development goals. 2) Developing marketing materials for the core research units to help link university core research facilities with start up company needs. In addition, created a manual for core facilities to use when working with start up companies: http://enterprise.uiowa.edu/researchpark/index.php?option=com_jdownloads&task=viewcategory&catid=1&Itemid=110 , 3) Staff support for UIRP, BVC and TIC and 4) Planning the first annual entrepreneurial education and celebration event in February that will highlight ICE accomplishments as well as recognize University of Iowa faculty, staff and students for entrepreneurial awards.						
University of Iowa	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009			
	Fund expenses at the new BioVentures Building	FY 2010 State Appropriations (GIVF)	\$300,000	\$0			
		FY 2010 Matching Funds (Other)	\$300,000	\$0			
Description of Project	The BioVentures Building was made possible by a collaborative partnership between Ryan Companies and the University of Iowa. The new building provides critical space and services for life science startup companies at the University of Iowa Research Park. The BioVentures Center will use these funds to pay debt associated with the construction of the new BioVentures Building.						
Anticipated End Results	Full occupancy of the BioVentures wet lab space and successful graduation of tenant companies to locations within the state of Iowa.						
Results achieved to Date/Plans	BioVentures Center Occupancy -- 9 of the 20 laboratories (45%) are occupied by tenant companies. Two (2) tenants have an option on another laboratory. One of those options expires February 2010 at which time the tenant is required to lease the lab or void the option. Eleven of the 19 offices are occupied by tenant companies (57%). We anticipate leasing (2) more laboratories in FY 2010.						

University of Iowa	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009			
	Support of the Office of Vice President of Research	FY 2010 State Appropriations (GIVF)	\$194,000	\$75,736			
		FY 2010 Matching Funds (Other)	\$194,000	\$75,736			
Description of Project	These funds will be used by the Vice President for Research & Economic Development for program integration and development (including salary support and funding opportunities to foster medium to long range projects that will impact economic development.						
Anticipated End Results	The VPR will lead a coordinated model focused on new business development, as well as linking Iowa based companies with various university assets. The overall goal is to establish a regional asset for individuals and companies interested in entrepreneurship.						
Results achieved to Date/Plans	Partial salary support for Vice President for Research and Economic Development and other key faculty and staff. With this increased focus on Economic Development he has been able to focus additional efforts in this area and as a result has presented to regional economic development groups in Dubuque and the Quad Cities. Additional focus also on the integration of IOWA Centers for Enterprise units and collaboration with community partners.						
University of Iowa	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009			
	Support training, consultation and outreach for Iowa entrepreneurs	FY 2010 State Appropriations (GIVF)	\$190,000	\$43,284			
		FY 2010 Matching Funds (Other)	\$190,000	\$67,774			
Description of Project	To fund expenses associated with training, consultation and outreach for Iowa entrepreneurs. John Pappajohn Entrepreneurial Center will continue to expand outreach programs for Iowans.						
Anticipated End Results	The Pappajohn Entrepreneurial Center, while continuing its strong state-wide focus on educating undergraduates, will increase its commitment to working with faculty/student and staff entrepreneurs who are interested in creating a start-up company, developing business plans, devising marketing strategies and seeking funding opportunities. JPEC will also provide the linkage between Iowa companies and the University expertise.						
Results achieved to Date/Plans	1) Hired a new Project Manager who started work in January 2010. His role is to identify opportunities and manage projects for existing Iowa-based companies to work with UI faculty/students in the areas of strategic business planning, market research and analysis, and operations/financial assessment. 2.) In the Fall JPEC held an Undergraduate Student Elevator Pitch competition which successfully had 42 participants to help early stage ventures raise capital for their business. Also in the Fall JPEC held a Faculty, Staff, and Graduate Assistant Elevator pitch competition which successfully had 40 participants to help early stage ventures raise capital.						

University of Iowa	Project	List of all FY 2010 Revenue Sources	Revenue Dollars for FY 2010	Amount of FY 2010 State Appropriations Expended as of 12/31/2009			
	Expand the Center for Biocatalysis & Bioprocessing into a state-of-the-art Bioprocessing Center	FY 2010 State Appropriations (GIVF)	\$241,500	\$66,500			
		FY 2010 Matching Funds (Other)	\$241,500	\$66,500			
Description of Project	To expand into a dedicated bioprocessing support for industrial biotechnology companies at the Center for Biocatalysis and Bioprocessing (CBB). Currently, CBB is deficient in performing these operations, which have the potential to convert soy and corn residues to fuels and chemicals. CBB has experienced a surge in these activities. This reflects the surge in DOE and Venture funding into companies involved in this area.						
Anticipated End Results	CBB has identified a critical need to build a dedicated process development center at their GLP facility. This facility would provide a scale-up solution to industrial biotechnology companies engaged in biofuels, biochemicals and biomaterials from corn stover, soy-oil and other agricultural feedstocks. Industrial Biotechnology is rapidly expanding; CBB is experiencing growth in this area as well, but would be well positioned for maximum growth with the new bioprocessing center. As CBB ramps up this activity, revenue is expected to grow as well. Potential to bring companies to establish pilot and manufacturing facilities in Iowa.						
Results achieved to Date/Plans	1) Several 30 L fermentors have already been ordered as a first step towards establishing capability in the industrial biotechnology area. 2) In FY2010, additional equipment like off-gas analysis, metabolite analysis and pilot scale extraction equipment will be added. 3) A start up company, Modular Genetics, has already started working with CBB in producing biosurfactants from soy-carbohydrate. This company is in the process of setting up a contract with CBB for 1-3 years, to work on soy-derived chemicals and other biosurfactants. 4) CBB is also joining hands with MIT towards production of biodiesel via fermentation (one project completed) and a joint grant worth \$350,000/year for 3 years. This grant has been submitted.						

University of Northern Iowa - as of December 31, 2009
 Grow Iowa Values Fund Appropriations

		FY 2009 GIVE Appropriation - \$950,000		
1	Technology Transfer and Business Incubation (5279)	\$320,000	\$256,000.00	\$760,000.00 Reflects 20% reduction due to state disaster reallocation
2	Rural Entrepreneurship (5281)	\$200,000	\$160,000.00	
3	Market Research (5283)	\$100,000	\$80,000.00	
4	Capacity building and Implementation for Regional Development (5280)	\$130,000	\$104,000.00	
5	National Ag-Based Lubricants (NABL) Center (5282)	\$200,000	\$160,000.00	
		FY 2010 GIVE Appropriation - \$855,000		
1	Technology Transfer and Business Incubation (5429)	\$288,000		Reflects 10% reduction to base appropriation
2	Rural Entrepreneurship (5431)	\$180,000		
3	Market Research (5433)	\$90,000		
4	Capacity building and Implementation for Regional Development (5430)	\$117,000		
5	National Ag-Based Lubricants (NABL) Center (5432)	\$180,000		

University of Northern Iowa	Project	List of all FY 2009 Revenue Sources	5279 Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009	List of all FY 2010 Revenue Sources	5429 Revenue Dollars for FY 2010	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
1	Technology Transfer and Business Incubation	FY 2009 State Appropriations (GIVE)	\$256,000	\$243,357	FY 2010 State Appropriations (GIVE)	\$288,000	\$92,097
		FY 2009 Federal Support		\$194,642	FY 2010 Federal Funding		\$361,027
		FY 2009 Other		\$72,583	FY 2010 Other		\$35,179
Description of Project	UNI continues to advance intellectual property disclosures, protection and commercialization across campus. Strategies for commercialization include licensing, strategic partnerships and new business development. The Innovation Incubator has created a hub facility, coalescing the existing strength of Intellectual Property disclosures and University research with quality business services to support commercialization and licensing. Now complete, the fourteen dedicated suites in the incubator offer a physical link between Iowa's business community, campus innovators and faculty researchers, completing the last leg of technology transfer at UNI. Central to this approach are multiple BCS programs that combine education and innovation - some new and some successfully established - working in tandem to create a rich spectrum of services and a unique physical environment to support technology transfer and entrepreneurship.						
Anticipated End Results	As technology transfer and intellectual property development continues to mature at UNI, we expect to generate 12-15 disclosures per year, file 5 patents, enter 2-3 license agreements and graduate 3-4 new companies into the Iowa economy annually; we expect that 50% of those served will be directly tied to commercialization resulting from research or innovation at UNI. These expected outcomes will result in UNI ranking highly for technology transfer activity among comprehensive undergraduate institutions.						
Results achieved to Date	Over the past 3 years, UNI has averaged 15 intellectual property disclosures and 2 license agreements. UNI-licensed technologies have resulted in approximately \$5 million in annual revenue for Iowa companies. For the first half of FY 10, UNI has received 4 disclosures, 3 patents were filed or perfected and 1 license agreement is in negotiation. The Student Business Incubator is full with one of the tenants again chosen as a finalist in the Global Student Entrepreneur Competition. The Innovation Incubator expansion is now complete, featuring 14 fully furnished business suites and support facilities dedicated to business growth. The incubator has attracted and served early stage companies and is nearly full. In addition, the 4th Street Incubator is currently in the process of graduating three companies into the regional economy.						
Plans	UNI will continue to focus on commercialization initiatives, including license negotiations and business start ups. Tenancy at the new Innovation Incubator will increase to 100% occupancy by the end of the fiscal year. At least 15 intellectual property disclosures will be received with 2-3 licensing agreements executed under patent or trade-secret provisions and UNI will B34-continue to support late-stage faculty research projects. In addition, the Student Business Incubator will remain full and generate spin-off companies for the Iowa economy. Expansion of the Innovation Incubator is now complete, offering 14 business suites of varying size and flexible student and employee work areas. With the final phase of the Innovation Incubator complete, marketing efforts to engage campus innovators, faculty researchers and targeted entrepreneurs in the region will become a primary focus.						
University of Northern Iowa	Project	List of all FY 2009 Revenue Sources	5281 Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009	List of all FY 2010 Revenue Sources	5431 Revenue Dollars for FY 2010	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
2	Rural Entrepreneurship	FY 2009 State Appropriations (GIVE)	\$160,000	\$156,273	FY 2010 State Appropriations (GIVE)	\$180,000	\$78,306
		FY 2009 Federal Support		\$84,836	FY 2010 Federal Funding		
		FY 2009 Other		\$75,437	FY 2010 Other		\$39,939
Description of Project	MyEntreNet is an entrepreneurship development system which identifies, recruits, networks and serves small business owners with information, services and access to capital in 14 rural regions across the state and one urban community. Through a comprehensive, technology-supported approach of building community capacity, customized technical assistance, networking and enhanced access to capital, MyEntreNet fills a gap in rural economic development in Iowa.						
Anticipated End Results	In FY 2010, MyEntre.Net's online community will grow by 25% to 4,000 Iowa small business owners engaged online. 500 small business owners will attend a regional EntreBash! event and 400 will go on to attend one or more events supported by a service provider partner participating in the MyEntreNet Master Calendar. Those served will generate 125 new or expanded businesses and create 300 new FTE jobs. 250 entrepreneurs representing 50 Iowa counties will attend the 3rd annual EntreBash! in February 2010.						
Results achieved to Date	MyEntre.Net's new online community was soft launched in mid-May of 2009 and a formal statewide marketing campaign was implemented in the fall of 2009. To date, 4,235 entrepreneurs representing every county in the state are engaged online; projections have been revised upward as a result, and we now anticipate that 6,000 Iowa small businesses will be engaged by fiscal year end. A partnership with the Iowa Bankers Association will be rolled out in February of 2010 and a new marketing campaign to engage employer firms will begin in May. A record number of EntreBash! events were hosted this past fall - nine in all - attracting 343 small business owners from 22 counties in the state. Entrepreneurship Economic Development Seminars were launched in Mount Pleasant and Sheldon, serving 122 community leaders, elected officials and professional developers with training to develop regional entrepreneurship support systems in their local communities. Plans for the 2010 EntreFest! conference are coming together; a record number of entrepreneurs and exhibitors are expected for the event scheduled February 25th and 26th in West Des Moines. Six Month Economic Impact: 70 business starts or expansions, 84 new FTE jobs created, \$9,361,200 in new commercial/equity investment statewide, 28 businesses downsized and 27 jobs were eliminated.						
Plans	Area 1 - Launch of a new MyEntre.Net as Iowa's Online Community for Small Business Owners and Entrepreneurs. New features and online resources to be developed, a statewide marketing campaign implemented and increased membership to 6,000 Iowa small business owners. Area 2 - Cluster Expansion: Training and technical assistance for service providers and communities to support entrepreneurship in clusters of counties, focusing on underserved rural regions. Area 3 - Lead a consortium of service providers and other partners in the planning and delivery of the third annual EntreFest!; Iowa's conference for small business and entrepreneurs.						

University of Northern Iowa	Project	List of all FY 2009 Revenue Sources	5283 Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009	List of all FY 2010 Revenue Sources	5433 Revenue Dollars for FY 2010	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
3	Market Research	FY 2009 State Appropriations (GIVF) FY 2009 Federal Support FY 2009 Other	\$80,000	\$80,000	FY 2010 State Appropriations (GIVF) FY 2010 Federal Funding FY 2010 Other	\$90,000	\$45,224
Description of Project	Strategic Marketing Services (SMS) is focused on market research projects for start-up and existing businesses and organizations to expand and stimulate economic growth across Iowa. All GIVF dollars are matched on a one-to-one basis with funds from the client. This project centers on market research that will provide the following services: 1) Assist businesses, entrepreneurs, and organizations in assessing the potential of an idea for a product/service concept or in growing their organization. 2) Provide a structured research protocol that the client can then implement on their own, with a provider of their choice, or by continuing to work with SMS.						
Anticipated End Results	Improve competitive intelligence for Iowa companies, thus increasing sales. Provide initial market screening and identify potential competitors for UNI faculty and staff research.						
Results achieved to Date	Specific accomplishments during FY 2010 (midyear) include: developed structured research protocols, provided strategic direction assistance, improved market intelligence for Iowa companies/organizations, and provided strategic assessments. Area 1: Market Research Based Projects – During FY 2010, engaged in projects with the following companies: Far Reach Technologies (Cedar Falls); Bentley Manufacturing & Machine Shop (Marion); UNI Tallgrass Prairie Center (Cedar Falls); Butler County Cheese (Parkersburg); Retirement Resource Center (Cedar Falls); Concierge Services (Cedar Falls); Retiree Database (Cedar Falls); In Home Services (Cedar Falls); Kerber Technology Solutions (Ankeny); G.P. Business Solutions (Wapello); Agri Tech Center (Waterloo). Area 2: Market Research Plans and Assessments - SMS consulted with four Iowa-based clients regarding the state of their businesses and discussed a Market Research Plan/Strategic Plan, along with an assessment of their situation. Costs for market research projects are split between the client and GIVF investment, with maximum GIVF support of \$10,000 per project.						
Plans	In order to attract additional Iowa-based companies to take advantage of available funding for market research, SMS continued a broad based marketing campaign initiated in 2008. Activities in this campaign include targeted mailings, news articles, and participation in the Entrefest! entrepreneurship conference. This two day event attracts entrepreneurs and small business owners from across the state.						
University of Northern Iowa	Project	List of all FY 2009 Revenue Sources	5280 Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009	List of all FY 2010 Revenue Sources	5430 Revenue Dollars for FY 2010	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
4	Capacity Building and Implementation for Regional Development/Helping Regions Succeed	FY 2009 State Appropriations (GIVF) FY 2009 Federal Support FY 2009 Other	\$104,000	\$104,000	FY 2010 State Appropriations (GIVF) FY 2010 Federal Funding FY 2010 Other	\$117,000	\$54,611
Description of Project	With the shared purpose of expanding and stimulating economic growth across the state of Iowa, the Institute for Decision Making (IDM) continues to implement regional development assistance programs that build capacity both regionally and locally to sustain Iowa's regional economies over the long term.						
Anticipated End Results	Improvements are expected in five key areas related to regional development: 1) sustainability of regional work and strengthening the collaborating member groups, 2) regional metrics pilot project, 3) social media as potential marketing tools, 4) economic adjustments and shifts to economic base, and 5) regional workforce assessments – skillsheds.						
Results achieved to Date	IDM provided facilitation assistance to three regions and successfully obtained a 2010 Regional Initiatives Grant for the Off-Shore Iowa (OSI) marketing efforts. IDM provided IDEED with a template for establishing regional benchmarks based on secondary data available to the department. IDM reviewed all provided regional work plans and provided IDEED with suggested region-specific benchmarks as related to those work plans. IDM built its staff capacity in social media as marketing tools by attending four webinars and multiple conference training modules. IDM staff used knowledge gained to pilot an initiative with the Heartland Economic Development Course, which increased the interest level among course participants, many of whom are in Iowa's economic regions. IDM researched, completed, and delivered a draft manual to IWD of practical guidance for local leadership who may potentially, or are actually dealing with mass layoffs or business closings. IDM identified several significant challenges inhibiting Regional Innovation Grant (RIG) follow-through (workforce assessments) after the federal funding ran out, thus yielding a low follow-through rate. In addition, IDM has assisted IWD and others with the development and completion of its initial pilot skillshed analysis in the Siouxland Region. A skillshed analysis integrates laborshed survey data, job vacancy survey data and other skill and career path data from secondary sources to map out potential skills-development paths for workers in a region.						
Plans	IDM will continue supporting regional targeting and marketing as requested, administering the grant to the Off-Shore Iowa virtual region, and assisting in the development of region-specific benchmarks. IDM anticipates integrating the use of social media marketing strategies into services and programs offered to regional marketing groups. IDM also expects to develop a social media best practices guidebook for economic development organizations. IDM will revise the Community Layoff and Crisis Response Manual based on feedback from IWD. IDM continues to provide feedback to IWD as they make revisions to the pilot skillshed study and move forward with additional studies.						
University of Northern Iowa	Project	List of all FY 2008 Revenue Sources	5282 Revenue Dollars for FY 2008	Amount of FY 2008 State Appropriations Expended as of 12/31/2008	List of all FY 2009 Revenue Sources	5432 Revenue Dollars for FY 2009	Amount of FY 2009 State Appropriations Expended as of 12/31/2009
5	National Ag-Based Lubricants (NABL) Center	FY 2008 State Appropriations (GIVF) FY 2008 Federal Support FY 2008 Other	\$160,000	\$160,000	FY 2009 State Appropriations (GIVF) FY 2010 Federal Funding FY 2010 Other	\$180,000	\$0
Description of Project	The NABL Center has established itself as the national leader in the biobased lubricants industry within the State of Iowa. As a globally recognized research center, NABL contributes to the growth of Iowa's bioeconomy with cutting-edge research involving biobased industrial and automotive lubricants and greases, functional fluids, and biobased product process and manufacturing technologies. NABL has become the primary source of expertise for biobased lubricants and greases in Iowa and the nation. This is especially important during a critical period of transition from a petroleum-based economy to a growing biobased economy.						
Anticipated End Results	As the anchor for TechWorks, a regional biobased economic development initiative, NABL's resources and expertise will be used to attract prospective biobased companies to Iowa. NABL will continue to provide support for the continued profitability and growth of the state's biobased products industry by offering credible performance testing resources and successful new product development.						
Results achieved to Date	To provide support for the growth of the state's biobased products industry, the NABL Center has expanded its reach by: <ul style="list-style-type: none"> Continuing to leverage NABL's 19 years of research to support Iowa's greater biobased industries, including biodiesel and ethanol plants, as well as entrepreneurs and biobased lubricant manufacturers. Investigating new uses for biofuels production process byproducts in profitable biolubricant applications. Testing novel methods to incorporate soybean oil-based lubricants in off-highway engine lubrication systems. Discovery of new microwave based heating methods for manufacturing of biobased machinery and automotive greases. Working with leading agribusinesses and with Iowa State University to identify beneficial oilseed traits, desirable for increased lubricant performance in biobased products. Serving as a consulting resource to national and international entities in developing biobased lubricant and greases using their indigenous crop oils. 						
Plans	NABL continues to lead the national efforts of promoting biobased lubricants. As a known center of excellence, NABL continues to provide input in the development of standards for performance of biobased lubricants. As the first tenant of TechWorks, a regional biobased economic development initiative, NABL will continue to support Iowa's economic growth by helping to attract biobased companies as they benefit from the extensive testing and developmental resources of NABL. The presence of the NABL Center adds credibility to the biobased lubricants industry, while the Center's resources and expertise encourage major agro-industrial companies to pursue biobased lubricant alternatives.						